

CONCRETE WATERPROOFING BY CRYSTALLIZATION™



MAKING CONCRETE BETTER

Waterproofing • Protection • Durability • Repair



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## XYPEX OVERVIEW

Our Company • Crystalline Technology • Xypex Products • The Projects





## INTRODUCTION

“Today, as we serve customers in more than 70 countries, I’m proud of our achievements...”



For more than 40 years, the ground-breaking crystalline waterproofing technology of Xypex Chemical Corporation has been serving concrete users worldwide. Our long established core values continue to guide every Xypex interaction and to define the conduct and behaviour that enhances the trust and confidence of our customers.

The pillars of our corporate mission have been key in the evolution and growth of the company and how we respond to the needs of our customers. Innovation, excellence, teamwork, integrity, accountability and performance are the values that have ensured solid, long-term relationships with our international team of licensees and distributors.

In thousands of applications, Xypex has fulfilled on a promise we made to ourselves right from the beginning. Our market would be global, our distributor network would be second to none, we would build an infrastructure of people who would be knowledgeable, responsive, and reliable. Our products, always, would be the best in the business.

Today, as we serve customers in more than seventy countries, I'm proud of our achievements, of the unique niche that we've earned, of the confidence that our customers have in our products and service – the knowledge that Xypex consistently makes concrete projects around the world better.

With technology, research, and constant testing, we'll keep doing it. We'll be there, where you are, with the people, the service, and the highest quality standards to ensure the job is done right.

**D'Arcy Mainwaring**  
PRESIDENT

## The Xypex Company

Xypex Chemical Corporation is one of the world's leading manufacturers of products for the waterproofing, protection and repair of concrete structures. In 1969 Xypex fundamentally changed and improved the approach to concrete waterproofing and protection, introducing Xypex "Concrete Waterproofing by Crystallization", a chemistry designed to work within the concrete itself instead of simply on its surface. The Xypex family of products evolved around varied applications of this unique technology and its ability to solve problems in situations where traditional barrier systems were weak or ineffective. It was a technology that made a very real difference to the integrity of concrete structures – and Xypex quickly responded to the new and diversified world of challenge and opportunity.



### THE CRYSTALLINE DIFFERENCE MARKETED WORLDWIDE

The crystalline difference became the basis for the company's branding strategy, spurred its growth, and helped shape its global marketing objectives. Over time, Xypex Crystalline Technology has become a universally recognized international standard for the concrete infrastructure in cities and wherever water threatens concrete's integrity.



## » XYPEX HEADQUARTERS



## » PROFESSIONAL SUPPORT



## » ON-SITE ANSWERS



### Home Base for a Global Mission

Vancouver, British Columbia, on Canada's west coast is the corporate home and primary manufacturing location of Xypex Chemical Corporation. Our modern facility – custom designed and built solely to accommodate the specific manufacturing and marketing needs of our company – includes the latest in material processing equipment along with a state-of-the-art testing laboratory and communications system. It is here that Xypex developed the systems and products for its global expansion, including the setting up of strategically located batch plants throughout the world, training programs for a network of international distributors and applicators, and ongoing research for an evolving product line in a world of diverse concrete waterproofing applications.

### Direction & Support

Xypex professionals are always available to provide a high level of technical support and project direction. Our objective is to make life easier on-site by having our knowledgeable people available when needed to provide the direction and technical advice that makes the Xypex application expedient and successful.

### Quality Assurance

The ongoing consistency and resulting confidence in Xypex operations, products and services, stems from our strict adherence to these quality systems and standards. Xypex's highly reliable position in the concrete industry has been propelled by its development of comprehensive quality systems.



BBA



BSI Group



CEBTP



European Union

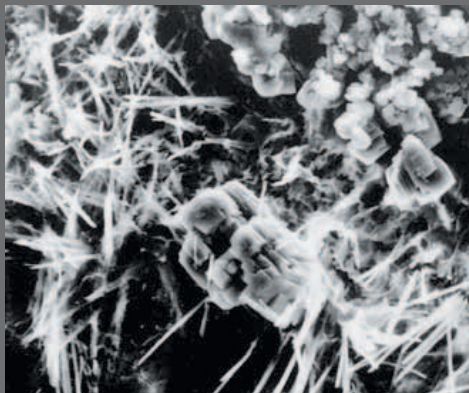
## Xypex Crystalline Technology

Basic to the development of Xypex Crystalline Technology was a thorough understanding of concrete's chemical and physical makeup. Concrete is porous. Its tunnel-like capillaries are a natural part of its mass, and permit the passage of water and other liquids. Researchers at Xypex recognized the opportunity for a chemical treatment that would fill these capillaries to prevent the penetration of water and other liquids from any direction. By means of diffusion, the reactive chemicals in Xypex products use water as a migrating medium to enter and travel down the capillaries of the concrete. This process precipitates a chemical reaction between Xypex, moisture and the by-products of cement hydration, forming a new non-soluble crystalline structure. This integral structure fills the capillary tracts rendering the concrete waterproof.

5000x Magnification



» CONCRETE (UNTREATED)



» XYPEX CRYSTALLIZATION (INITIATION)

After 26 Days



» XYPEX CRYSTALLIZATION (MATURE)



### THE CRYSTALLINE DIFFERENCE PROTECTS CONCRETE INTEGRITY

Xypex forms a non-soluble crystalline structure that is integral with the concrete. Capillaries become discontinuous and impermeable to water, even under extreme hydrostatic pressure.



## » QUALITY TESTING



### Proof in the Field

Xypex products are specified on thousands of concrete structures around the world. Our high performance standards have resulted in customer expectations that are equally high. Strict adherence to quality systems, ongoing research, and highly informed on-site direction and support is our way of managing high expectations whether it be for major projects like the Panama Canal and the Pennsylvania Turnpike, or for a modest backyard swimming pool. Xypex has attained a reliable reputation and enviable position in the concrete industry because our products and service consistently live up to the project demands of our customers.

## » PH & BATCH QUALITY CONTROL



## » RESEARCH & DEVELOPMENT



### Proof in the Lab

Xypex has been thoroughly tested for permeability, chemical resistance, compressive strength, freeze-thaw durability, potable water and more, in independent labs around the world.



University of New South Wales,  
Sydney, Australia



Aviles Engineering Corp.  
Houston, USA



Japan Atomic Energy Research  
Institute, Tokyo, Japan



Metro Testing Laboratories,  
Vancouver, Canada

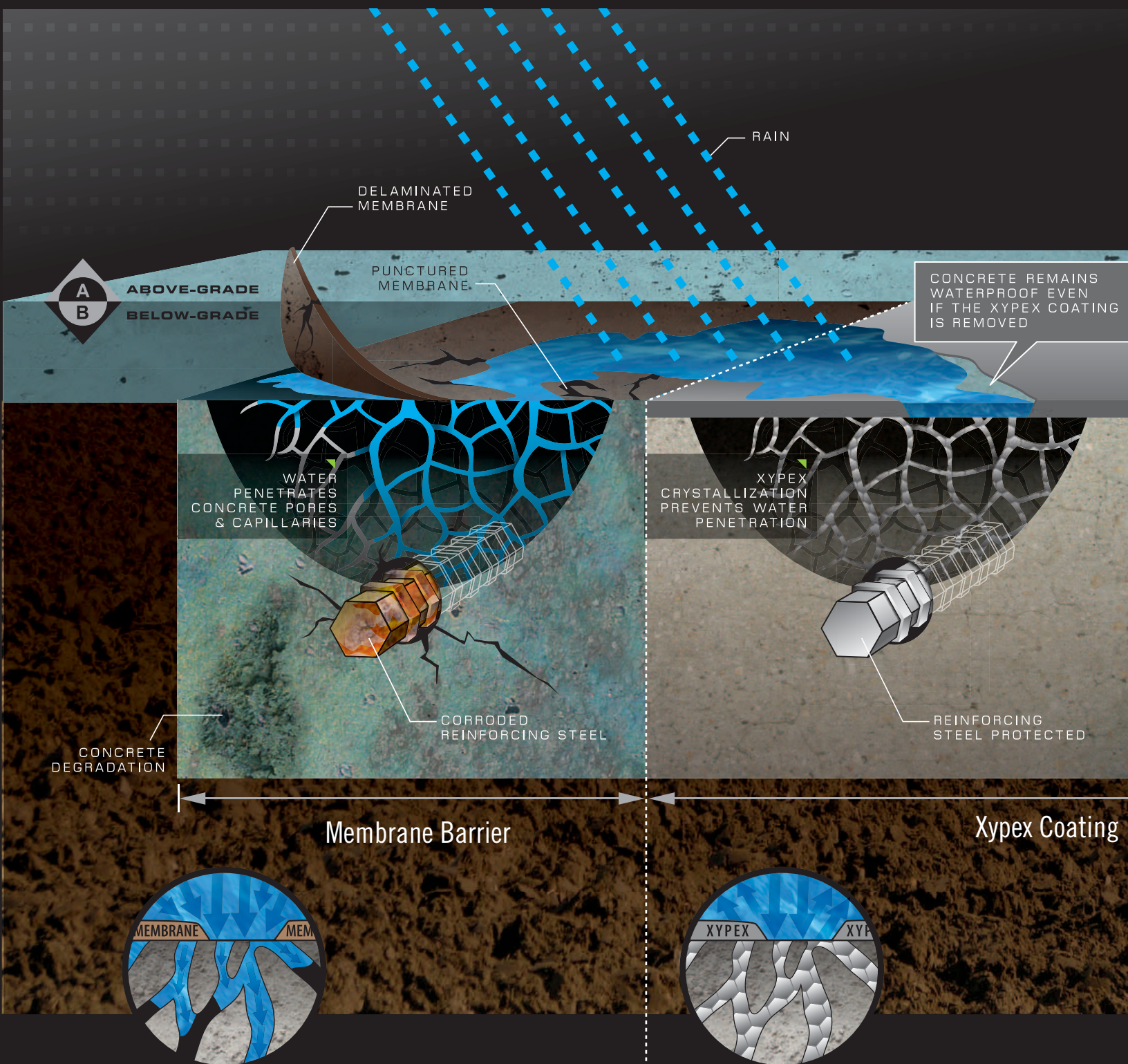


Klokner Institute of the Czech  
Technical University, Prague,  
Czech Republic



Setso Services,  
Pte. Ltd, Singapore





## The Problem with Membranes

Membranes and other traditional barrier systems are intended to work on the outside of concrete. They rely on the bond they achieve with the concrete surface. The illustration shows what can occur when the surface-bond of a membrane is broken. Whether by puncturing or hydrostatic pressure, the membrane has delaminated, opening pathways through which water and other damaging liquids can easily enter, penetrate and damage the concrete. The protection, durability and overall integrity of the concrete is weakened, and the reinforcing steel has corroded.

## The Xypex Crystalline Solution

Xypex products are designed to work inside the concrete. Xypex chemicals penetrate the pores and capillaries of the concrete, react with the by-products of cement hydration and form a non-soluble crystalline structure deep within the slab. In this condition, the concrete becomes impermeable, preventing the penetration of water from any direction, and preventing the corrosive effects of moisture and oxidation on reinforcing steel.



# XYPEX TECHNOLOGY

This illustration of concrete shows how Xypex Crystalline Technology works to remedy the primary problems that concrete encounters because of its naturally porous condition. The illustration also highlights the areas where traditional barrier and membrane systems are weak or ineffective and why Xypex products provide a reliable solution.

AGGRESSIVE  
CHEMICALS

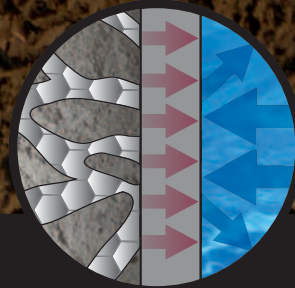
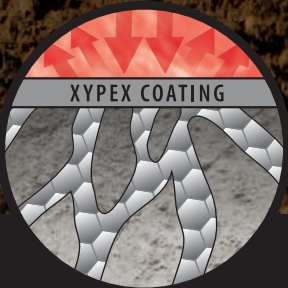


XYPEX  
CRYSTALLIZATION  
PREVENTS CHEMICAL  
PENETRATION

XYPEX CRYSTALLIZATION  
RESISTS EXTREME  
HYDROSTATIC PRESSURE

EXTREME  
HYDROSTATIC  
PRESSURE

[ Xypex can also be installed as an additive. In this form, Xypex Crystalline Technology becomes integral with the entire concrete matrix from the time of batching. ]



## Resisting Aggressive Chemicals

Xypex products are used on many projects where aggressive chemicals threaten the integrity of concrete. Wastewater treatment plants, bridges, chemical containment structures, highways and marine environments all benefit from Xypex crystalline technology and its ability to prevent the penetration of a wide range of chemicals including mild acids, solvents, chlorides and caustic materials. Because Xypex is pH specific, it will protect concrete from any chemical whose pH range is 3.0 to 11.0 constant contact, or 2.0 to 12.0 periodic contact.

## Resisting Hydrostatic Pressure

Reservoirs, swimming pools, aquariums, wastewater treatment plants, dams, marine and a host of below-grade structures are subject to the pressure of water and other fluids from either the inside or the outside of their concrete framework. Because Xypex is not dependent on surface adhesion but instead becomes an integral part of the concrete mass, it is capable of resisting extreme hydrostatic pressure. Independent test results have shown that a two-coat application of Xypex eliminates leakage at pressures of at least 400 ft. of head pressure.

## Xypex Product Line

Xypex products are specifically designed to waterproof and protect concrete structures. Fundamental to the Xypex product line is the unique Xypex Crystalline Technology which generates a distinct crystalline structure within the pores and capillary tracts of the concrete matrix. This crystalline formation is non-soluble and permanent, sealing concrete against the penetration of water and other aggressive liquids from any direction, even under extreme hydrostatic pressure. Whether installed as a coating, a dry-shake or an additive, Xypex's unique chemical treatment has been proven around the world, addressing a variety of demanding construction situations. Customer confidence in Xypex products is supported through extensive independent testing, numerous approvals and certifications, and a far-reaching technical support network.



### THE CRYSTALLINE DIFFERENCE

The reactive chemicals in Xypex migrate throughout the concrete matrix and react with water and the by-products of cement hydration to form a permanent, non-soluble crystalline structure within the capillary tracts and pores of the concrete to seal and render it impenetrable to water and other liquids from any direction.



## » COATING APPLICATION



## » ADDITIVE APPLICATION



## » DRY SHAKE APPLICATION



### Xypex is Different

- ✓ The Xypex crystalline process works deep inside the concrete mass to prevent the penetration of water and aggressive chemicals. In contrast, barrier-type products function only at the surface of the concrete.
- ✓ Because Xypex is not dependent on surface adhesion, it is resistant to extreme hydrostatic pressure.
- ✓ Xypex is not subject to the deterioration problems encountered by membranes.
- ✓ Xypex seals hairline cracks up to 0.4 mm.
- ✓ Xypex is permanent and reactivates whenever water is present.

### Xypex Application Advantages

- Xypex is available as a coating, dry shake or additive. This is an asset to the value engineering process and to the flexibility of the construction schedule.
- Xypex coatings do not require a dry surface; in fact, a wet surface is necessary.
- Xypex coatings can be applied to either side of the concrete.
- Xypex cannot puncture, tear or come apart at the seams.
- Xypex does not require costly surface priming or leveling and is less costly to apply than most other methods.
- Xypex does not require sealing, lapping and finishing of seams at corners, edges or between membranes.
- Protection during backfilling or during placement of steel, wire mesh or other materials is not required.

## COATING SYSTEM



### Concentrate

Xypex Concentrate is applied as a cementitious slurry to the surface of existing above-or-below grade structures to waterproof and protect the concrete against high hydrostatic pressures.



### Modified

Xypex Modified can be applied as a second coat to chemically reinforce Concentrate, or as a single coat for the damp-proofing of exterior foundation walls.

## CONCRETE REPAIR & ACCESSORY PRODUCTS



### Patch'n Plug

Xypex Patch'n Plug is a fast-setting, high bond strength hydraulic cement compound enhanced by Xypex Crystalline Technology. Patch'n Plug can stop flowing water in seconds and is also used to repair defects in concrete.



### Megamix Series

Megamix I is a thin parge coat for the waterproofing and resurfacing of vertical masonry or concrete surfaces. Megamix II is a thick repair mortar for the patching and resurfacing of deteriorated concrete.



## ADDITIVE SERIES



### Admix C-Series

Xypex Admix products are added to concrete at the time of batching, providing contractors with a convenient and cost-effective waterproofing solution for delivering Xypex Crystalline Technology.

## DRY SHAKE SERIES



### Concentrate DS-Series

Xypex DS products are formulated specifically for dry shake installation into freshly poured concrete slabs providing waterproofing, chemical protection and resistance to abrasion.



### FCM 80

Xypex FCM, with its exceptional adhesive and elongation characteristics, is used to repair cracks subject to movement, seal construction joints and waterproof and restore deteriorated concrete structures.



### Restora-Top Series

Xypex Restora-Top products are designed for the repair and rehabilitation of horizontal concrete surfaces such as concrete slabs, ramps, decks and walkways where the repaired area must be returned quickly to normal service.

## Xypex Projects

Xypex products for the waterproofing, protection and repair of concrete have been used on a wide range of above and below grade projects around the world. But, as strong as concrete is for endless applications, its flaw is that over time, through the tiniest pathways within its structure, concrete permits the passage of water and other potentially damaging liquids. Water can become concrete's staunchest enemy, permitting the ingress of water and aggressive chemicals. This can result in the rusting of reinforcing steel and the deterioration of the structure. Xypex Crystalline Technology and the Xypex integrated product line have, for more than forty years, successfully challenged the damaging action of water.



### THE CRYSTALLINE DIFFERENCE IN EVERY PROJECT

Xypex forms a non-soluble crystalline structure within the pores and capillaries of concrete to prevent the penetration of water from any direction, even under extreme hydrostatic pressure.



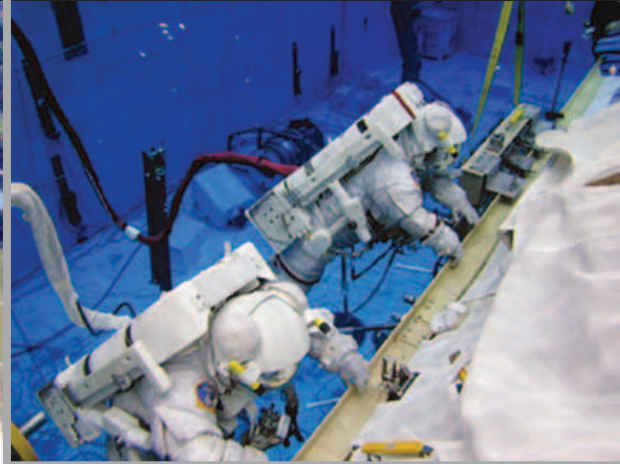
## » WATER & WASTEWATER TREATMENT



### Water & Wastewater Treatment

Around the world, Xypex has worked with engineers responsible for tackling the challenge of wastewater and environmental responsibility. Xypex products are well suited for use on concrete structures used for the collection, pumping and treatment of wastewater. Concrete pipe, lift stations and tanks must be protected from the water and aggressive chemicals common to sewage. The crystalline waterproofing technology of Xypex works within the concrete to make it impermeable and resistant to chemical attack. Wastewater is thereby contained, and the neighboring environment and the structure itself is protected.

## » WATER HOLDING



## » BELOW GRADE



### Water Holding

Water holding structures are about keeping water *inside* and Xypex Crystalline Technology, with its ability to resist extreme hydrostatic pressure, has been used extensively to waterproof and protect the concrete of a wide variety of water holding structures: reservoirs for potable water, filtration plants, swimming pools – including NASA's Neutral Buoyancy Tank used for the training of astronauts, and an aquarium that encloses the world's largest artificial ocean.

### Below Grade

More often than not, Xypex waterproofing takes place underground where concrete requires protection against any number of potentially invasive water forces. Below grade, the crystalline technology of Xypex products resists hydrostatic pressure and protects against reinforcing steel corrosion and sulfate attack.



## » TUNNELS



### Tunnels

Tunnels serve many purposes such as transporting people or goods, accessing minerals from deep in the earth, or providing conduits for electrical and telecommunications services. Proper waterproofing of tunnels is one of the most cost effective ways to enhance safety and function as well as increase the service life of these structures. From bored roadway tunnels to subways, water seepage and resulting problems caused by hydrostatic pressure and freeze/thaw are always a concern. Xypex Crystalline Technology, and its ability to resist extreme hydrostatic pressure, aggressive soils and traffic contaminants, is used the world-over to waterproof, protect and enhance the durability of tunnels.

## » BRIDGES



## » MARINE STRUCTURES



### Bridges

Concrete durability is key in the building of bridges. The unique Xypex Crystalline Technology of Xypex products addresses the many problems that age and/or aggressive environmental conditions such as harsh weather and constant traffic impose on these concrete structures.

### Marine Structures

Xypex Crystalline Technology protects concrete structures in marine environments – structures that are exposed to the damaging effects of seawater, chlorides and other aggressive elements. Preventing corrosion of reinforcing steel and resulting concrete degradation has made Xypex an important treatment for a variety of marine installations including wharfs, bridge pilings, locks, desalination conduits and seawalls.



## » DAMS



### Dams

Dams, whether for hydroelectric production or water management, are all about water – keeping it secure and protecting the unique components that are engineered into every dam structure. Hydrostatic pressure is, of course, common to all dams and Xypex Crystalline Technology with its proven ability to resist even extreme hydrostatic pressure has been the answer to the waterproofing problems faced by some of the largest dams in the world. Xypex is used to waterproof and protect many features of dams including the upstream and downstream faces, pipe galleries, spillways, wall joints, and discharge chambers.

## » POWER GENERATING FACILITIES



## » PRECAST



### Power Generating Facilities

Ensuring the integrity of concrete structures and, at the same time, protecting the surrounding environment is critical in the power industry. Xypex Crystalline Technology products have made an important contribution in waterproofing and protecting hydroelectric facilities, desalination plants, thermal and nuclear power stations and cooling tower basins.

### Precast

Using the Xypex Admix C-Series of products, precast manufacturers can add value to their products. Xypex Admix is blended into the concrete at the time of batching enabling companies manufacturing precast products such as manholes, box culverts, pipe, architectural panels and highway median barriers to waterproof and protect their products before they leave the plant.

# Beinggreen

We don't always wave our green, environment-friendly flag, but Xypex, and its family of crystalline concrete waterproofing products have always had a warm relationship with their surroundings. *Being There* in more than seventy countries for more than forty years has given us a global understanding of environmental standards and expectations. We continue to support programs like ISO and building-rating systems like LEED that reinforce product quality, corporate responsibility and today's environmental concerns. To Xypex, *Being There* and *Being Green* are ongoing commitments. Energy efficiency, material selection, minimizing site impact, and VOC reduction – these are the 'green' benefits that non-toxic Xypex products provide the construction world and the pursuit of environmental sustainability.



## **XYPEX PRODUCTS PROTECT CONCRETE & THE ENVIRONMENT**

- ✓ No VOCs (volatile organic compounds)
- ✓ Enhances durability for longer building life
- ✓ Innovative 'green' technologies
- ✓ Concrete with Xypex can be recycled
- ✓ Produced globally. Distributed locally.
- ✓ Energy efficient









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## XYPEX PRODUCTS

Product Line • Product Data • Xypex FAQ • Repair & Application







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## Coating System

Xypex Coating products, for surface application, are part of the Xypex concrete waterproofing and protection system and represent one of three different ways to install Xypex Crystalline Technology into concrete.



### Xypex Concentrate

Xypex Concentrate is applied as a cementitious slurry to the surface of existing above-or-below-grade structures to waterproof and protect the concrete against high hydrostatic pressure.

- apply with a semi-stiff nylon bristle brush or spray machine
- also mixed in Dry-Pac form for sealing construction joints and repairing cracks and tie-holes

#### Packaging

##### Pails

20 lb. (9.1 kg)  
60 lb. (27.2 kg)

##### Bags

50 lb. (22.7 kg)



### Xypex Modified

Xypex Modified can be applied as a second coat to chemically reinforce Concentrate, or as a single coat for the damp-proofing of exterior foundation walls.

- as a second coat, apply after the Concentrate coating has reached an initial set
- produces a harder finish

#### Packaging

##### Pails

60 lb. (27.2 kg)

##### Bags

50 lb. (22.7 kg)



## Additive Series

Xypex Additive products, added to the concrete at time of batching, are part of the Xypex concrete waterproofing and protection system and represent one of three different ways to install Xypex Crystalline Technology into concrete.



### Xypex Admix C-500, C-1000, C-2000

Xypex Admix products are added to concrete or mortar at the time of batching. Admix C-500, C-1000, and C-2000 have been formulated to satisfy specific concrete mix designs, diverse project requirements and ambient temperature variations. The Admix is also available in a "No Fines Grade" (NF).

- installation methods: shotcrete, precast, poured
- convenient, cost-effective
- meets varying project and temperature conditions
- better control over construction schedule

#### Packaging

**Pails**  
C-1000 & C-2000  
60 lb. (27.2 kg)

**Bags**  
C-500, C-1000  
& C-2000  
50 lb. (22.7 kg)



### Xypex Admix Soluble Bags

Xypex Admix C-500 and C-1000 are available in soluble bags to make installation and dosing easier and more convenient.

- convenient
- cost-saving
- improves quality control

#### Packaging

**Soluble Bags in Cartons**  
C-500 & C-1000  
10 lb. (4.5 kg)  
12 lb. (5.5 kg)  
15 lb. (6.8 kg)



## Dry Shake Series

Xypex Dry Shake products, for horizontal surfaces, are part of the Xypex concrete waterproofing and protection system and represent one of three different ways to install Xypex Crystalline Technology into concrete.



### Xypex Concentrate DS-1

Xypex DS-1 is a special dry shake formulation of Xypex Concentrate and is designed specifically for horizontal concrete surfaces such as parking decks and floor slabs. DS-1 is trowelled into fresh concrete prior to finishing.

- applied by hand or mechanical spreader
- reduces the risk of scaling, dusting and delamination that is typically associated with coatings

#### Packaging

**Pails**  
60 lb. (27.2 kg)



### Xypex Concentrate DS-2

Xypex DS-2, like DS-1, is also designed for horizontal concrete surfaces but is used where, in addition to waterproofing, greater resistance to abrasion is required.

- applied by hand or mechanical spreader
- increases abrasion resistance

#### Packaging

**Pails**  
60 lb. (27.2 kg)

**Bags**  
60 lb. (27.2 kg)

## CONCRETE REPAIR & ACCESSORY PRODUCTS



### Concrete Repair & Accessory Products

Xypex provides a number of specialized products for a wide range of concrete repair applications such as stopping flowing water, patching, resurfacing, and rehabilitating concrete as well as the repairing of cracks.



#### Xypex Patch'n Plug

Xypex Patch'n Plug is formulated as a crystalline, fast-setting hydraulic cement compound for concrete patching and repair. It stops flowing water in seconds and is used to seal cracks, fill tie-holes and other defects in concrete.

- fast-setting, non-shrinking
- high bond strength

#### Packaging

**Pails**  
20 lb. (9.1 kg)  
60 lb. (27.2 kg)



#### Xypex Megamix I and II

Xypex Megamix I is a thin parge coat for the waterproofing and resurfacing of vertical masonry or concrete surfaces, as a cap coat for Xypex Concentrate, or as an architectural rendering. Megamix II is a thick repair mortar for the patching and resurfacing of deteriorated concrete.

- superior bonding
- chemical durability
- high strength

#### Packaging

**Pails**  
Megamix I & II  
60 lb. (27.2 kg)  
**Bags**  
Megamix II only  
55 lb. (25 kg)



**CONCRETE REPAIR & ACCESSORY PRODUCTS**



**Xypex Restora-Top 50, 100, 200**

Xypex Restora-Top products are designed specifically for the repair and rehabilitation of horizontal concrete surfaces such as warehouse floors, decks, curbs, and walkways where the repaired area must be returned to normal service within two to four hours of the completed repair.

- rapid setting and strength gain
- excellent adhesion, superior durability

**Packaging**

**Pails**  
55 lb. (25 kg)



**Xypex FCM 80**

Xypex FCM is designed for repairing cracks subject to movement, sealing construction joints, restoring deteriorated concrete and waterproofing concrete structures. FCM is a two component product consisting of a liquid polymer dispersion and a cementitious powder component.

- exceptional adhesive and elongation characteristics
- often used in conjunction with the Xypex Crystalline Concrete Waterproofing System

**Packaging**

**Liquid**  
5.3 gal. (20 litre) pails  
**Powder**  
27.5 lb. (12.5 kg) bags

FCM 80 is also available in a carton as a unit (kit), which includes:  
1.06 gal. (4 litre) bottle  
22 lb. (10 kg) pail

## CONCRETE REPAIR & ACCESSORY PRODUCTS



### Xypex Gamma Cure

Xypex Gamma Cure is a curing agent designed specifically for Xypex crystalline waterproofing products. Its use may eliminate the need for water curing the Xypex coating in some cases.

- where water-curing is not possible
- vertical surfaces; hot, dry, windy conditions

#### Packaging

##### Bottles

1 U.S. gal. (3.79 litres)

##### Pails

5 U.S. gal. (18.95 litres)



### Xycrylic Admix

Xycrylic Admix is a water-based polymer dispersion designed for fortifying Portland cement compositions. The liquid is milky-white in colour and has a high solids content. Can be used with Xypex Patch'n Plug to increase bond strength.

- enhances bond, reduces shrinkage cracking
- excellent water and weather resistance

#### Packaging

##### Bottles

1 U.S. gal. (3.79 litres)

##### Pails

5 U.S. gal. (18.95 litres)



### Xypex Quickset

Xypex Quickset is a water-soluble liquid blend of silicates, neutralizers and penetrating agents specially compounded to harden, dustproof and seal the surfaces of fresh or newly cured concrete floors.

- enhances abrasion resistance
- recommended for concrete slabs where hard, dustproof surface is required

#### Packaging

##### Bottles

1 U.S. gal. (3.79 litres)

##### Pails

5 U.S. gal. (18.95 litres)







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### Concrete Waterproofing

**07160**

### Cementitious Crystalline

#### Description

Xypex is a unique chemical treatment for the waterproofing, protection and repair of concrete. XYPEX CONCENTRATE is the most chemically active product within the Xypex Crystalline Waterproofing System. When mixed with water, this light grey powder is applied as a cementitious slurry coat to above-grade or below-grade concrete, either as a single coat or as the first of a two-coat application. It is also mixed in Dry-Pac form for sealing strips at construction joints, or for the repairing of cracks, faulty construction joints and honeycombs. Xypex prevents the penetration of water and other liquids from any direction by causing a catalytic reaction that produces a non-soluble crystalline formation within the pores and capillary tracts of concrete and cement-based materials.

#### Recommended for:

- Reservoirs
- Sewage and Water Treatment Plants
- Underground Vaults
- Secondary Containment Structures
- Foundations
- Tunnels and Subway Systems
- Swimming Pools
- Parking Structures

#### Advantages

- Resists extreme hydrostatic pressure
- Becomes an integral part of the substrate
- Can seal hairline cracks up to 0.4 mm
- Allows concrete to breathe
- Highly resistant to aggressive chemicals
- Non-toxic

- Does not require a dry surface
- Cannot puncture, tear or come apart at the seams
- No costly surface priming or leveling prior to application
- Does not require sealing, lapping and finishing of seams at corners, edges or between membranes
- Can be applied to the positive or the negative side of the concrete surface
- Does not require protection during backfilling or during placement of steel, wire mesh or other materials
- Less costly to apply than most other methods
- Not subject to deterioration
- Permanent

#### Packaging

Xypex Concentrate is available in 20 lb. (9.1 kg) pails, 60 lb. (27.2 kg) pails and 50 lb. (22.7 kg) bags.

#### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

#### Coverage

For normal surface conditions, the coverage rate for each Xypex coat is 6 to 7.2 sq. ft./lb. (1.25 - 1.5 lb./sq. yd. or 0.65 - 0.8 kg/m<sup>2</sup>).

#### Test Data

##### PERMEABILITY

**U.S. Army Corps of Engineers (USACE) CRD C48-73, "Permeability of Concrete", Pacific Testing Labs, Seattle, USA**

Two in. (51 mm) thick, 2000 psi (13.8 MPa) Xypex-treated concrete samples were pressure tested up to a 405 ft. (124 m) water head (175 psi/1.2 MPa), the limit of the testing apparatus. While untreated samples showed marked leakage, the Xypex-treated samples (as a result of the crystallization process) became totally sealed and exhibited no measurable leakage.

**DIN 1048, "Water Impermeability of Concrete",  
Bautest – Corporation for Research & Testing  
of Building Materials, Augsburg, Germany**

Twenty cm thick Xypex-treated concrete samples were pressure tested up to 7 bars (230 ft./70 m water head) for 24 hours to determine water impermeability. While the reference specimens measured water penetration up to a depth of 92 mm, Xypex-treated samples measured water penetration of zero to an average of 4 mm.

**ÖNORM B 3303, "Water Impermeability of Concrete",  
Technologisches Gewerbemuseum, Federal Higher  
Technical Education & Research Institute,  
Vienna, Austria**

Xypex-treated concrete samples were pressure tested to a maximum 7 bars (230 ft./70 m water head) for 10 days. Test revealed that while 25 ml of water had penetrated the untreated concrete samples, zero ml had penetrated the Xypex-treated samples. Test specimens were then broken and showed water penetration to a depth of 15 mm on untreated samples but no measurable water penetration on the Xypex-treated samples.

**CSN 1209/1321, "Impermeability and Resistance  
to Pressurized Water", Institute of Civil Engineering,  
Technology and Testing, Bratislava, Slovak Republic**

Xypex-treated and untreated concrete samples were exposed to 1.2 MPa of pressure to determine water permeability. Results showed the Xypex-treated samples provided effective protection against hydrostatic water pressure. Treated and untreated samples were also subjected to contact with silage juices and various petroleum products (e.g. diesel oil, transformer oil, gasoline) at 14 kPa for 28 days. The Xypex-treated samples significantly reduced the penetration of these solutions.

#### CHEMICAL RESISTANCE

**ASTM C 267-77, "Chemical Resistance to Mortars",  
Pacific Testing Labs, Seattle, USA**

Xypex-treated cylinders and untreated cylinders were exposed to hydrochloric acid, caustic soda, toluene, mineral oil, ethylene glycol, pool chlorine and brake fluid and other chemicals. Results indicated that chemical exposure did not have any detrimental effects on the Xypex coating. Tests following chemi-

cal exposure measured an average 17% higher compressive strength in the Xypex-treated specimens over the untreated control samples.

**IWATE University Technical Report,  
"Resistance to Acid Attack", Tokyo, Japan**

Xypex-treated mortar and untreated mortar were measured for acid resistance after exposure to a 5% H<sub>2</sub>SO<sub>4</sub> solution for 100 days. Xypex suppressed concrete erosion to 1/8 of the reference samples.

#### FREEZE/THAW DURABILITY

**ASTM C 672, "Standard Test Method for Scaling  
Resistance of Concrete Surfaces Exposed to  
De-Icing Chemicals", Twin City Testing Lab,  
St. Paul, USA**

Xypex-treated samples restricted chloride ion concentration to below the level necessary to promote electrolytic corrosion of reinforcing steel. Visual examination of untreated panels after 50 freeze/thaw cycles showed a marked increase in surface deterioration compared to Xypex-treated samples.

**JIS A 6204, "Concrete Freeze/Thaw", Japan Testing  
Center for Construction Materials, Tokyo, Japan**

The resonating frequency of both untreated and Xypex-treated concrete samples were measured throughout 435 freeze/thaw cycles. At 204 cycles, the Xypex-treated samples showed 96% relative durability compared to 90% in the untreated samples. At 435 cycles, the Xypex-treated samples measured 91% relative durability compared to 78% in the untreated reference samples.

#### POTABLE WATER EXPOSURE

**NSF 61, "Drinking Water System Component-  
Health Effects", NSF International, Ann Arbor, USA**

Exposure testing of potable water in contact with Xypex-treated samples indicated no harmful effects.

#### RADIATION RESISTANCE

**U.S.A. Standard No. N69, "Protective Coatings  
for the Nuclear Industry", Pacific Testing Labs,  
Seattle, USA**

After exposure to 5.76 x 10<sup>4</sup> rads of gamma radiation, the Xypex treatment revealed no ill effects or damages.



## Application Procedures

**1. SURFACE PREPARATION** Concrete surfaces to be treated must be clean and free of laitance, dirt, film, paint, coating or other foreign matter. Surfaces must also have an open capillary system to provide “tooth and suction” for the Xypex treatment. If surface is too smooth (e.g. where steel forms are used) or covered with excess form oil or other foreign matter, the concrete should be lightly sandblasted, water-blasted, or etched with muriatic (HCL) acid.

**2. STRUCTURAL REPAIR** Rout out cracks, faulty construction joints and other structural defects to a depth of 1.5 in. (37 mm) and a width of 1 in. (25 mm). Apply a brush coat of Xypex Concentrate as described in steps 5 & 6 and allow to dry for 10 minutes. Fill cavity by tightly compressing Dry-Pac into the groove with pneumatic packing tool or with hammer and wood block. Dry-Pac is prepared by mixing six parts Xypex Concentrate powder with one part water to a dry, lumpy consistency.

### NOTE:

i. Against a direct flow of water (leakage) or where there is excess moisture due to seepage, use Xypex Patch’n Plug then Xypex Dry-Pac followed by a brush coat of Xypex Concentrate. (Refer to Xypex Specifications and Applications Manual for full details.)

ii. For expansion joints or chronic moving cracks, flexible materials such as expansion joint sealants should be used.

**3. WETTING CONCRETE** Xypex requires a saturated substrate and a damp surface. Concrete surfaces must be thoroughly saturated with clean water prior to the application so as to aid the proper curing of the treatment and to ensure the growth of the crystalline formation deep within the pores of the concrete. Remove excess surface water before the application. If concrete surface dries out before application, it must be re-wetted.

**4. MIXING FOR SLURRY COAT** Mix Xypex powder with clean water to a creamy consistency in the following proportions:

### For Brush Application

1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>)

5 parts powder to 2 parts water

2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>)

3 parts powder to 1 part water

### For Spray Application

1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>)

5 parts powder to 3 parts water

(ratio may vary with equipment type)

Do not mix more Xypex material than can be applied in 20 minutes. Do not add water once mix starts to harden. Protect hands with rubber gloves.

**5. APPLYING XYPEX** Apply Xypex with a semi-stiff nylon bristle brush, push broom (for large horizontal surfaces) or specialized spray equipment. The coating must be uniformly applied and should be just under 1/16 in. (1.25 mm). When a second coat (Xypex Concentrate or Xypex Modified) is required, it should be applied after the first coat has reached an initial set but while it is still “green” (less than 48 hours). Light pre-watering between coats may be required due to drying. The Xypex treatment must not be applied under rainy conditions or when ambient temperature is below 40°F (4°C). For recommended equipment, contact Xypex Chemical Corporation or your nearest Xypex distributor.

**6. CURING** A misty fog spray of clean water must be used for curing the Xypex treatment. Curing should begin as soon as the Xypex has set to the point where it will not be damaged by a fine spray of water. Under normal conditions, it is sufficient to spray Xypex-treated surfaces three times per day for two to three days. In hot or arid climates, spraying may be required more frequently. During the curing period, the coating must be protected from rainfall, frost, wind, the puddling of water and temperatures below 36°F (2°C) for a period of not less than 48 hours after application. If plastic sheeting is used as protection, it must be raised off the Xypex to allow the coating to breathe. Xypex Gamma Cure may be used in lieu of water curing for certain applications (consult with Xypex Chemical Corporation or your nearest Xypex distributor).

**NOTE:** For concrete structures that hold liquids (e.g. reservoirs, swimming pools, tanks, etc.), Xypex should be cured for three days and allowed to set for 12 days before filling the structure with liquid.

## Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

## Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

## Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.



## Concrete Waterproofing

**07160**

## Cementitious Crystalline

### Description

Xypex is a unique chemical treatment for the waterproofing, protection and repair of concrete. XYPEX MODIFIED can be applied as a second coat to reinforce Xypex Concentrate, or applied by itself to damp-proof the exterior of foundation walls. Applied as a second coat, Xypex Modified chemically reinforces Xypex Concentrate where two coats are required and produces a harder finish. Where damp-proofing is required, a single coat of Modified may be used as an alternative to a spray/tar emulsion. Xypex prevents the penetration of water and other liquids from any direction by causing a catalytic reaction that produces a non-soluble crystalline formation within the pores and capillary tracts of concrete and cement-based materials.

### Recommended for:

Xypex Modified is recommended as a single coat for the damp-proofing of foundations or as a second coat with Xypex Concentrate for the following applications:

- Reservoirs
- Sewage and Water Treatment Plants
- Secondary Containment Structures
- Tunnels and Subway Systems
- Underground Vaults
- Foundations
- Parking Structures
- Swimming Pools

### Advantages

- Resists extreme hydrostatic pressure
- Becomes an integral part of the substrate
- Allows concrete to breathe
- Resistant to aggressive chemicals
- Non-toxic

- Does not require dry weather or a dry surface
- Cannot puncture, tear or come apart at the seams
- No costly surface priming or leveling prior to application
- Does not require sealing, lapping and finishing of seams at corners, edges or between membranes
- Can be applied to the positive or the negative side of the concrete surface
- Does not require protection during backfilling or during placement of steel, wire mesh or other materials
- Less costly to apply than most other methods
- Not subject to deterioration
- Permanent

### Packaging

Xypex Modified is available in 60 lb. (27.2 kg) pails and 50 lb. (22.7 kg) bags.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

### Coverage

For normal surface conditions, the coverage rate for each coat is 6 - 7.2 sq. ft. per lb. (1.25 - 1.5 lb. per sq. yd. or 0.65 - 0.8 kg/m<sup>2</sup>).

### Test Data

When used in conjunction with Xypex Concentrate:

#### PERMEABILITY

**U.S. Army Corps of Engineers (USACE) CRD C48-73, "Permeability of Concrete", Pacific Testing Labs, Seattle, USA**

Two in. (51 mm) thick, 2000 psi (13.8 MPa) Xypex-treated concrete samples were pressure tested up to a 405 ft. (124 m) water head (175 psi/1.2 MPa), the limit of the testing apparatus. While untreated samples showed marked leakage, the Xypex-treated samples (as a result of the crystallization process) became totally sealed and exhibited no measurable leakage.

**DIN 1048, "Water Impermeability of Concrete",  
Bautest – Corporation for Research & Testing  
of Building Materials, Augsburg, Germany**

Twenty cm thick Xypex-treated concrete samples were pressure tested up to 7 bars (230 ft./70 m water head) for 24 hours to determine water impermeability. While the reference specimens measured water penetration up to a depth of 92 mm, Xypex-treated samples measured water penetration of zero to an average of 4 mm.

**ÖNORM B 3303, "Water Permeability of Concrete",  
Technologisches Gerwerbemuseum, Federal  
Higher Technical Education & Research Institute,  
Vienna, Austria**

Xypex-treated concrete samples were pressure tested to a maximum 7 bars (230 ft./70 m water head) for 10 days. Test revealed that while 25 ml of water had penetrated the untreated concrete samples, zero ml had penetrated the Xypex-treated samples. Test specimens were then broken and showed water penetration to a depth of 15 mm on untreated samples but no measurable water penetration on the Xypex-treated samples.

**CSN 1209/1321, "Impermeability and Resistance  
to Pressurized Water", Institute of Civil Engineering,  
Technology and Testing, Bratislava, Slovak Republic**

Xypex-treated and untreated concrete samples were exposed to 1.2 MPa of pressure to determine water permeability. Results showed the Xypex-treated samples provided effective protection against hydrostatic water pressure. Treated and untreated samples were also subjected to contact with silage juices and various petroleum products (e.g. diesel oil, transformer oil, gasoline) at 14 kPa for 28 days. The Xypex-treated samples significantly reduced the penetration of these solutions.

#### CHEMICAL RESISTANCE

**ASTM C 267-77, "Chemical Resistance to Mortars",  
Pacific Testing Labs, Seattle, USA**

Xypex-treated cylinders and untreated cylinders were exposed to hydrochloric acid, caustic soda, toluene, mineral oil, ethylene glycol, pool chlorine and brake fluid and other chemicals. Results indicated that chemical exposure did not have any detrimental effects on the Xypex coating. Tests following chemical

exposure measured an average 17% higher compressive strength in the Xypex-treated specimens over the untreated control samples.

**IWATE University Technical Report,  
"Resistance to Acid Attack", Tokyo, Japan**

Xypex-treated mortar and untreated mortar were measured for acid resistance after exposure to a 5% H<sub>2</sub>SO<sub>4</sub> solution for 100 days. Xypex suppressed concrete erosion to 1/8 of the reference samples.

#### FREEZE/THAW DURABILITY

**ASTM C 672, "Standard Test Method for Scaling  
Resistance of Concrete Surfaces Exposed to  
De-Icing Chemicals", Twin City Testing Lab,  
St. Paul, USA**

Xypex-treated samples restricted chloride ion concentration to below the level necessary to promote electrolytic corrosion of reinforcing steel. Visual examination of untreated panels after 50 freeze/thaw cycles showed a marked increase in surface deterioration compared to Xypex-treated samples.

#### POTABLE WATER EXPOSURE

**NSF 61, "Drinking Water System Component-  
Health Effects", NSF International, Ann Arbor, USA**

Exposure testing of potable water in contact with Xypex-treated samples indicated no harmful effects.

#### RADIATION RESISTANCE

**U.S.A. Standard No. N69, "Protective Coatings  
for the Nuclear Industry", Pacific Testing Labs,  
Seattle, USA**

After exposure to 5.76 x 10<sup>4</sup> rads of gamma radiation, the Xypex treatment revealed no ill effects or damages.

### Application Procedures

**1. SURFACE PREPARATION** Concrete surfaces to be treated must be clean and free of laitance, dirt, film, paint, coating or other foreign matter. Surfaces must also have an open capillary system to provide "tooth and suction" for the Xypex treatment. If surface is too smooth (e.g. where steel forms are used) or covered with excess form oil or other foreign matter, the concrete should be lightly sandblasted, waterblasted, or etched with muriatic (HCL) acid.



**2. STRUCTURAL REPAIR** Rout out cracks, faulty construction joints and other structural defects to a depth of 1.5 in. (37 mm) and a width of 1 in. (25 mm). Apply a brush coat of Xypex Concentrate as described in steps 5 & 6 and allow to dry for 10 minutes. Fill cavity by tightly compressing Dry-Pac into the groove with pneumatic packing tool or with hammer and wood block. Dry-Pac is prepared by mixing six parts Xypex Concentrate powder with one part water to a dry, lumpy consistency.

**NOTE:**

i. Against a direct flow of water (leakage) or where there is excess moisture due to seepage, use Xypex Patch'n Plug then Xypex Dry-Pac followed by a brush coat of Xypex Concentrate. (Refer to Xypex Specifications and Applications Manual for full details.)

ii. For expansion joints or chronic moving cracks, flexible materials such as expansion joint sealants should be used.

**3. WETTING CONCRETE** Xypex requires a saturated substrate and a damp surface. Concrete surfaces must be thoroughly saturated with clean water prior to the application so as to aid the proper curing of the treatment and to ensure the growth of the crystalline formation deep within the pores of the concrete. Remove excess surface water before the application. If concrete surface dries out before application, it must be re-wetted.

**4. MIXING FOR SLURRY COAT** Mix Xypex powder with clean water to a creamy consistency in the following proportions:

**For Brush Application**

1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>)  
5 parts powder to 2 parts water

2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>)  
3 parts powder to 1 part water

**For Spray Application**

1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>)  
5 parts powder to 3 parts water  
(ratio may vary with equipment type)

Do not mix more Xypex material than can be applied in 20 minutes. Do not add water once mix starts to harden. Protect hands with rubber gloves.

**5. APPLYING XYPEX** Apply Xypex with a semi-stiff nylon bristle brush, push broom (for large horizontal surfaces) or specialized spray equipment. The coating must be uniformly applied and should be just under 1/16 in. (1.25 mm). When a second coat (Xypex Concentrate or Xypex Modified) is required, it should be applied after the first coat has reached an initial set but while it is still "green" (less than 48 hours). Light pre-watering between coats may be required due to drying. The Xypex treatment must not be applied under rainy conditions or when ambient temperature is below 40°F (4°C). For recommended equipment, contact Xypex Chemical Corporation or your nearest Xypex distributor.

**6. CURING** A misty fog spray of clean water must be used for curing the Xypex treatment. Curing should begin as soon as the Xypex has set to the point where it will not be damaged by a fine spray of water. Under normal conditions, it is sufficient to spray Xypex-treated surfaces three times per day for two to three days. In hot or arid climates, spraying may be required more frequently. During the curing period, the coating must be protected from rainfall, frost, wind, the puddling of water and temperatures below 36°F (2°C) for a period of not less than 48 hours after application. If plastic sheeting is used as protection, it must be raised off the Xypex to allow the coating to breathe. Xypex Gamma Cure may be used in lieu of water curing for certain applications (consult with Xypex Chemical Corporation or your nearest Xypex distributor).

**NOTE:** For concrete structures that hold liquids (e.g. reservoirs, swimming pools, tanks, etc.), Xypex should be cured for three days and allowed to set for 12 days before filling the structure with liquid.

## Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

## Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

## Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.



## Concrete Waterproofing

**07160**

## Cementitious Crystalline

### Description

Xypex is a unique chemical treatment for the waterproofing, protection and improvement of concrete. XYPEX ADMIX C-500 is added to the concrete mix at the time of batching. Xypex Admix C-500 consists of Portland cement, very fine treated silica sand and various active, proprietary chemicals. These active chemicals react with the moisture in fresh concrete and with the by-products of cement hydration to cause a catalytic reaction which generates a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete. Thus the concrete becomes permanently sealed against the penetration of water or liquids from any direction. The concrete is also protected from deterioration due to harsh environmental conditions.

### Xypex Admix C-Series

The Admix C-Series has been specially formulated to meet varying project and temperature conditions. **Xypex Admix C-500** is specifically formulated to meet modern concrete practices that incorporate additives such as fly ash and slag. For most concrete mix designs adding the Admix C-500 will have minimal or no effect on setting time. **Xypex Admix C-1000** is designed for typical Portland cement-rich concrete, where normal to a mild retarded set is desired. **Xypex Admix C-2000** is designed for projects where extended retardation is required due to high ambient temperatures or long ready-mix delivery times. See Setting Time and Strength for more details. Consult with a Xypex technical services representative for the most appropriate Xypex Admix for your project.

### Recommended for:

- Reservoirs
- Sewage and Water Treatment Plants
- Secondary Containment Structures
- Tunnels and Subway Systems
- Underground Vaults

- Foundations
- Parking Structures
- Swimming Pools
- Precast Components

### Advantages

- Resists extreme hydrostatic pressure from either positive or negative surface of the concrete
- Becomes an integral part of the substrate
- Highly resistant to aggressive chemicals
- Can seal static hairline cracks up to 0.4 mm
- Allows concrete to breathe
- Non-toxic
- Less costly to apply than most other methods
- Permanent
- Added to the concrete at time of batching and therefore is not subject to climatic restraints
- Increases flexibility in construction scheduling

### Packaging

Xypex Admix C-500 is available in 50 lb. (22.7 kg) bags and in cartons containing 10 lb. (4.5 kg), 12 lb. (5.5 kg), and 15 lb. (6.8 kg) soluble bags. For specific projects, contact the manufacturer for availability of custom sized packaging.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

### Dosage Rates

#### Xypex Admix C-500:

2 - 3% by weight of cement

#### Xypex Admix C-500 NF (No Fines Grade):

1 - 1.5% by weight of cement

**NOTE:** Under certain conditions, the dosage rate for No Fines Grade may be as low as 0.8% depending on the quantity and type of total cementitious materials. The maximum use level is 2% by weight of cement for potable water applications.

Consult with Xypex's Technical Services Department for assistance in determining the appropriate dosage rate and for further information regarding enhanced

chemical resistance, optimum concrete performance, or meeting the specific requirements and conditions of your project.

## Test Data

### PERMEABILITY

**U.S. Army Corps of Engineers CRD C48-73,**  
**"Permeability of Concrete", Aviles Engineering Corp.,**  
**Houston, USA**

Two concrete samples containing Xypex Admix at 3% and 5% respectively, and an untreated control sample were tested for water permeability. Both the treated and untreated samples were subjected to a pressure of 150 psi (350 ft. water head). Results showed moisture and permeated water throughout the untreated sample after 24 hours. However, the Xypex Admix samples showed no leakage, and water penetration of only 1.5 mm after 120 hours (5 days).

**U.S. Army Corps of Engineers CRD C48-73,**  
**"Permeability of Concrete", Setco Services,**  
**Pte Ltd., Singapore**

Six Xypex Admix-treated and six untreated concrete samples were tested for water permeability. Pressure was gradually increased over five days and then maintained at 7 bars (224 ft. water head) for 10 days. While the six reference samples showed water leakage beginning on the fifth day and increasing throughout the test period, the Xypex Admix samples showed no water leakage at any time during the test.

**DIN 1048, "Water Impermeability of Concrete",**  
**DICTU S.A., Dept. of Engineering and Construction**  
**Mgt., Santiago, Chile**

Concrete samples 120 mm thick containing Xypex Admix were tested with the same size reference samples for water impermeability. Samples were subjected to hydrostatic pressure for 28 days. Water totally permeated the untreated samples but no water penetration was detected in any of the Xypex Admix-treated samples.

### COMPRESSIVE STRENGTH

**ASTM C 39, "Compressive Strength of Cylindrical**  
**Concrete Specimens", HBT Agra, Vancouver, Canada**

Concrete samples containing Xypex Admix at various dosage rates (1%, 2% and 5%) were tested against an untreated concrete control sample. Compressive

strength test results after 28 days indicated a significant strength increase in the samples incorporating Xypex Admix. The compressive strength increase varied between 5% and 20% (depending on the Xypex Admix dosage rate) over that of the reference sample.

**ASTM C 39, "Compressive Strength of Cylindrical**  
**Concrete Specimens", Kleinfelder Laboratories,**  
**San Francisco, USA**

At 28 days, the compressive strength test of the concrete containing Xypex Admix measured 7160 psi as compared to the reference sample at 6460 psi (a 10% increase).

### CHEMICAL RESISTANCE

**JIS, "Chemical Durability Test", Japanese Utility**  
**Company, In-house Test Report, Tokyo, Japan**

Concrete samples containing Xypex Admix were tested against five samples containing other admixtures and against a control sample, to determine resistance to corrosion and deterioration caused by contact with aggressive chemicals. All samples were soaked in a 5% sulfuric acid solution at 20°C for six months. Various evaluations and measurements were assessed every month during the test period, including: photographic comparisons, relative dynamic modulus of elasticity, percentage change in length, weight and flexural rigidity. Although the Xypex Admix sample was subjected to acid conditions well outside its published range, the results confirmed Xypex with the best performance among the seven samples tested.

**"Sulfuric Acid Resistance Test",**  
**Aviles Engineering Corporation, Houston, USA**

Concrete samples containing Xypex Admix at different dosage rates (3%, 5% and 7%) were tested against untreated control samples for sulfuric acid resistance. After immersion in the sulfuric acid, each sample was tested for weight loss on a daily basis until a weight loss of 50% or a definite response trend was obtained. The percentage weight loss of the samples containing Xypex Admix tested significantly lower than the control samples.

**"Sulphate Resistance Test",**  
**Taywood Engineering Ltd., Perth, Australia**

Xypex Admix-treated concrete samples were immersed in an ammonium-sulphate solution and tested for "resistance in a harsh environment". The performance



of the Xypex crystalline technology was compared with five other concretes, including one containing a sulphate-resistant cement. Each of the test samples was cured for seven days and then placed in an ammonium-sulphate solution (132 g/litre) for 180 days. The rate of corrosion was determined by measuring weight loss, and length change was noted on a weekly basis. The Xypex crystalline technology substantially improved concrete performance as compared to the reference concrete and tested very similar to the sulphate-resistant concrete. The Xypex Admix-treated samples also provided the highest level of protection as measured by change in length.

#### FREEZE/THAW DURABILITY

**ASTM C 666, "Freeze/Thaw Durability",  
Independent Laboratory, Cleveland, USA**

After 300 freeze/thaw cycles, the Xypex Admix-treated samples indicated 94% relative durability.

#### POTABLE WATER EXPOSURE

**NSF 61, "Drinking Water System Component-  
Health Effects", NSF International, Ann Arbor, USA**

Exposure testing of potable water in contact with Xypex-treated samples indicated no harmful effects.

### Directions for Use

Xypex Admix C-500 must be added to the concrete at the time of batching. The sequence of procedures for addition will vary according to the type of batch plant operation and equipment:

#### 1. READY MIX PLANT - DRY BATCH OPERATION

Add Xypex Admix in powder form to the drum of the ready-mix truck. Drive the ready-mix truck under the batch plant and add the balance of the materials in accordance with standard concrete batching practices. Mix materials for a minimum of 5 minutes to ensure that the Xypex Admix has been thoroughly dispersed throughout the concrete.

#### 2. READY MIX PLANT - CENTRAL MIX OPERATION

Mix Xypex Admix with water to form a very thin slurry (e.g. 15 - 20 lb./6.75 - 9 kg of powder mixed with 3 U.S. gallons/13.6 litres of water). Pour the required amount of material into the drum of the ready-mix truck. The aggregate, cement and water should be

batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready-mix truck). Pour the Admix slurry into the truck and mix for at least 5 minutes to ensure even distribution of the Xypex Admix throughout the concrete.

**3. PRECAST BATCH PLANT** Add Xypex Admix to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

#### NOTE:

i. It is important to obtain a homogeneous mixture of Xypex Admix with the concrete. Therefore, do not add dry Admix powder directly to wet concrete as this may cause clumping and thorough dispersion will not occur.

ii. Concrete containing the Xypex Admix does not preclude the requirement for design of crack control, construction joint detailing and measures for repairing defects in concrete (i.e. honeycombing, tie holes, cracks beyond specified limits).

For further information regarding the proper use of Xypex Admix for a specific project, consult with a Xypex technical services representative.

### Setting Time and Strength

The setting time of concrete is affected by the chemical and physical composition of ingredients, temperature of the concrete and climatic conditions. Xypex Admix C-500 is specifically formulated to meet modern concrete practices that incorporate additives such as fly ash and slag. For most concrete mix designs adding the Xypex Admix C-500 will have minimal or no effect on setting time. Concrete containing the Xypex Admix C-500 may develop higher early and ultimate strengths than plain concrete particularly where fly ash and slag are used. Trial mixes should be carried out under project conditions to determine the setting time and strength of the concrete dosed with Xypex Admix C-500. Consult with a Xypex technical services representative for the most appropriate Xypex Admix for your project.

## Limitations

When incorporating Xypex Admix, the temperature of the concrete mix should be above 40°F (4°C).

## Technical Services

For more instructions, alternative installation methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

## Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

## Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.

## XYPEX ADMIX C-1000

DAT-ADM1 • REV-10-09



### Concrete Waterproofing

**07160**

### Cementitious Crystalline

### Description

Xypex is a unique chemical treatment for the waterproofing, protection and improvement of concrete. XYPEX ADMIX C-1000 is added to the concrete mix at the time of batching. Xypex Admix C-1000 consists of Portland cement, very fine treated silica sand and various active, proprietary chemicals. These active chemicals react with the moisture in fresh concrete and with the by-products of cement hydration to cause a catalytic reaction which generates a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete. Thus the concrete becomes permanently sealed against the penetration of water or liquids from any direction. The concrete is also protected from deterioration due to harsh environmental conditions.

### Xypex Admix C-Series

The Admix C-Series has been specially formulated to meet varying project and temperature conditions. **Xypex Admix C-500** is specifically formulated to meet modern concrete practices that incorporate additives such as fly ash and slag. For most concrete mix designs adding the Admix C-500 will have minimal or no effect on setting time. **Xypex Admix C-1000** is designed for typical Portland cement-rich concrete, where normal to a mild retarded set is desired. **Xypex Admix C-2000** is designed for projects where extended retardation is required due to high ambient temperatures or long ready-mix delivery times. See Setting Time and Strength for more details. Consult with a Xypex technical services representative for the most appropriate Xypex Admix for your project.

### Recommended for:

- Reservoirs
- Sewage and Water Treatment Plants
- Secondary Containment Structures

- Tunnels and Subway Systems
- Underground Vaults
- Foundations
- Parking Structures
- Swimming Pools
- Precast Components

### Advantages

- Resists extreme hydrostatic pressure from either positive or negative surface of the concrete
- Becomes an integral part of the substrate
- Highly resistant to aggressive chemicals
- Can seal static hairline cracks up to 0.4 mm
- Allows concrete to breathe
- Non-toxic
- Less costly to apply than most other methods
- Permanent
- Added to the concrete at time of batching and therefore is not subject to climatic restraints
- Increases flexibility in construction scheduling

### Packaging

Xypex Admix C-1000 is packaged in 60 lb. (27.2 kg) pails and 50 lb. (22.7 kg) bags. Admix C-1000 is also available in cartons containing 10 lb. (4.5 kg), 12 lb. (5.5 kg), and 15 lb. (6.8 kg) soluble bags. For specific projects, contact the manufacturer for availability of custom sized packaging.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

### Dosage Rates

#### Xypex Admix C-1000:

2 - 3% by weight of cement

#### Xypex Admix C-1000 NF (No Fines Grade):

1 - 1.5% by weight of cement

**NOTE:** Under certain conditions, the dosage rate for No Fines Grade may be as low as 0.8% depending on the quantity and type of total cementitious materials. The maximum use level is 2% by weight of cement for potable water applications.

Consult with Xypex's Technical Services Department for assistance in determining the appropriate dosage rate and for further information regarding enhanced chemical resistance, optimum concrete performance, or meeting the specific requirements and conditions of your project.

## Test Data

### PERMEABILITY

**U.S. Army Corps of Engineers CRD C48-73,**  
**"Permeability of Concrete", Aviles Engineering Corp.,**  
**Houston, USA**

Two concrete samples containing Xypex Admix at 3% and 5% respectively, and an untreated control sample were tested for water permeability. Both the treated and untreated samples were subjected to a pressure of 150 psi (350 ft. water head). Results showed moisture and permeated water throughout the untreated sample after 24 hours. However, the Xypex Admix samples showed no leakage, and water penetration of only 1.5 mm after 120 hours (5 days).

**U.S. Army Corps of Engineers CRD C48-73,**  
**"Permeability of Concrete", Setsco Services,**  
**Pte Ltd., Singapore**

Six Xypex Admix-treated and six untreated concrete samples were tested for water permeability. Pressure was gradually increased over five days and then maintained at 7 bars (224 ft. water head) for 10 days. While the six reference samples showed water leakage beginning on the fifth day and increasing throughout the test period, the Xypex Admix samples showed no water leakage at any time during the test.

**DIN 1048, "Water Impermeability of Concrete",**  
**DICTU S.A., Dept. of Engineering and Construction**  
**Mgt., Santiago, Chile**

Concrete samples 120 mm thick containing Xypex Admix were tested with the same size reference samples for water impermeability. Samples were subjected to hydrostatic pressure for 28 days. Water totally permeated the untreated samples but no water penetration was detected in any of the Xypex Admix-treated samples.

### COMPRESSIVE STRENGTH

**ASTM C 39, "Compressive Strength of Cylindrical Concrete Specimens", HBT Agra, Vancouver, Canada**

Concrete samples containing Xypex Admix at various dosage rates (1%, 2% and 5%) were tested against an untreated concrete control sample. Compressive strength test results after 28 days indicated a significant strength increase in the samples incorporating Xypex Admix. The compressive strength increase varied between 5% and 20% (depending on the Xypex Admix dosage rate) over that of the reference sample.

**ASTM C 39, "Compressive Strength of Cylindrical Concrete Specimens", Kleinfelder Laboratories,**  
**San Francisco, USA**

At 28 days, the compressive strength test of the concrete containing Xypex Admix measured 7160 psi as compared to the reference sample at 6460 psi (a 10% increase).

### CHEMICAL RESISTANCE

**JIS, "Chemical Durability Test", Japanese Utility**  
**Company, In-house Test Report, Tokyo, Japan**

Concrete samples containing Xypex Admix were tested against five samples containing other admixtures and against a control sample, to determine resistance to corrosion and deterioration caused by contact with aggressive chemicals. All samples were soaked in a 5% sulfuric acid solution at 20°C for six months. Various evaluations and measurements were assessed every month during the test period, including: photographic comparisons, relative dynamic modulus of elasticity, percentage change in length, weight and flexural rigidity. Although the Xypex Admix sample was subjected to acid conditions well outside its published range, the results confirmed Xypex with the best performance among the seven samples tested.

**"Sulfuric Acid Resistance Test",**  
**Aviles Engineering Corporation, Houston, USA**

Concrete samples containing Xypex Admix at different dosage rates (3%, 5% and 7%) were tested against untreated control samples for sulfuric acid resistance. After immersion in the sulfuric acid, each sample was tested for weight loss on a daily basis until a weight loss of 50% or a definite response trend was obtained. The percentage weight loss of the samples containing Xypex Admix tested significantly lower than the control samples.



***“Sulphate Resistance Test”,  
Taywood Engineering Ltd., Perth, Australia***

Xypex Admix-treated concrete samples were immersed in an ammonium-sulphate solution and tested for “resistance in a harsh environment”. The performance of the Xypex crystalline technology was compared with five other concretes, including one containing a sulphate-resistant cement. Each of the test samples was cured for seven days and then placed in an ammonium-sulphate solution (132 g/litre) for 180 days. The rate of corrosion was determined by measuring weight loss, and length change was noted on a weekly basis. The Xypex crystalline technology substantially improved concrete performance as compared to the reference concrete and tested very similar to the sulphate-resistant concrete. The Xypex Admix-treated samples also provided the highest level of protection as measured by change in length.

**FREEZE/THAW DURABILITY**

***ASTM C 666, “Freeze/Thaw Durability”,  
Independent Laboratory, Cleveland, USA***

After 300 freeze/thaw cycles, the Xypex Admix-treated samples indicated 94% relative durability.

**POTABLE WATER EXPOSURE**

***NSF 61, “Drinking Water System Component-  
Health Effects”, NSF International, Ann Arbor, USA***

Exposure testing of potable water in contact with Xypex-treated samples indicated no harmful effects.

## Directions for Use

Xypex Admix C-1000 must be added to the concrete at the time of batching. The sequence of procedures for addition will vary according to the type of batch plant operation and equipment:

### 1. READY MIX PLANT - DRY BATCH OPERATION

Add Xypex Admix in powder form to the drum of the ready-mix truck. Drive the ready-mix truck under the batch plant and add the balance of the materials in accordance with standard concrete batching practices. Mix materials for a minimum of 5 minutes to ensure that the Xypex Admix has been thoroughly dispersed throughout the concrete.

### 2. READY MIX PLANT - CENTRAL MIX OPERATION

Mix Xypex Admix with water to form a very thin slurry (e.g. 15 - 20 lb./6.75 - 9 kg of powder mixed with 3 U.S. gallons/13.6 litres of water). Pour the required amount of material into the drum of the ready-mix truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready-mix truck). Pour the Admix slurry into the truck and mix for at least 5 minutes to ensure even distribution of the Xypex Admix throughout the concrete.

**3. PRECAST BATCH PLANT** Add Xypex Admix to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

**NOTE:**

i. It is important to obtain a homogeneous mixture of Xypex Admix with the concrete. Therefore, do not add dry Admix powder directly to wet concrete as this may cause clumping and thorough dispersion will not occur.

ii. Concrete containing the Xypex Admix does not preclude the requirement for design of crack control, construction joint detailing and measures for repairing defects in concrete (i.e. honeycombing, tie holes, cracks beyond specified limits).

For further information regarding the proper use of Xypex Admix for a specific project, consult with a Xypex technical services representative.

## Setting Time and Strength

The setting time of concrete is affected by the chemical and physical composition of ingredients, temperature of the concrete and climatic conditions. Xypex Admix C-1000 is designed for typical Portland cement-rich concrete, where normal to a mild retarded set is desired. Concrete containing the Xypex Admix C-1000 may develop higher ultimate strengths than plain concrete. Trial mixes should be carried out under project conditions to determine the setting time and strength of the concrete dosed with Xypex Admix C-1000.

Consult with a Xypex technical services representative for the most appropriate Xypex Admix for your project.

### Limitations

When incorporating Xypex Admix, the temperature of the concrete mix should be above 40°F (4°C).

### Technical Services

For more instructions, alternative installation methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

### Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

### Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.



### Concrete Waterproofing

**07160**

**Cementitious  
Crystalline**

### Description

Xypex is a unique chemical treatment for the waterproofing, protection and improvement of concrete. XYPEX ADMIX C-2000 is added to the concrete mix at the time of batching. Xypex Admix C-2000 consists of Portland cement, very fine treated silica sand and various active, proprietary chemicals. These active chemicals react with the moisture in fresh concrete and with the by-products of cement hydration to cause a catalytic reaction which generates a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete. Thus the concrete becomes permanently sealed against the penetration of water or liquids from any direction. The concrete is also protected from deterioration due to harsh environmental conditions.

### Xypex Admix C-Series

The Admix C-Series has been specially formulated to meet varying project and temperature conditions. **Xypex Admix C-500** is specifically formulated to meet modern concrete practices that incorporate additives such as fly ash and slag. For most concrete mix designs adding the Admix C-500 will have minimal or no effect on setting time. **Xypex Admix C-1000** is designed for typical Portland cement-rich concrete, where normal to a mild retarded set is desired. **Xypex Admix C-2000** is designed for projects where extended retardation is required due to high ambient temperatures or long ready-mix delivery times. See Setting Time and Strength for more details. Consult with a Xypex technical services representative for the most appropriate Xypex Admix for your project.

### Recommended for:

- Reservoirs
- Sewage and Water Treatment Plants

- Secondary Containment Structures
- Tunnels and Subway Systems
- Underground Vaults
- Foundations
- Parking Structures
- Swimming Pools
- Precast Components

### Advantages

- Resists extreme hydrostatic pressure from either positive or negative surface of the concrete
- Becomes an integral part of the substrate
- Highly resistant to aggressive chemicals
- Can seal static hairline cracks up to 0.4 mm
- Allows concrete to breathe
- Non-toxic
- Less costly to apply than most other methods
- Permanent
- Added into the concrete at time of batching and therefore is not subject to climatic restraints
- Increases flexibility in construction scheduling

### Packaging

Xypex Admix C-2000 is packaged in 60 lb. (27.2 kg) pails and 50 lb. (22.7 kg) bags. For specific projects, contact the manufacturer for availability of custom sized packaging.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

### Dosage Rates

#### Xypex Admix C-2000:

2% by weight of cement  
(do not exceed recommended dosage rate)

#### Xypex Admix C-2000 NF (No Fines Grade):

1.2% by weight of cement  
(do not exceed recommended dosage rate)

**NOTE:** Under certain conditions, the dosage rate for No Fines Grade may be as low as 0.8% depending on the quantity and type of total cementitious materials. The maximum use level is 2% by weight of cement for potable water applications.

Consult with Xypex's Technical Services Department for assistance in determining the appropriate dosage rate and for further information regarding enhanced chemical resistance, optimum concrete performance, or meeting the specific requirements and conditions of your project.

## Test Data

### PERMEABILITY

**U.S. Army Corps of Engineers CRD C48-73,**  
**"Permeability of Concrete", Aviles Engineering Corp.,**  
**Houston, USA**

Two concrete samples containing Xypex Admix at 3% and 5% respectively, and an untreated control sample were tested for water permeability. Both the treated and untreated samples were subjected to a pressure of 150 psi (350 ft. water head). Results showed moisture and permeated water throughout the untreated sample after 24 hours. However, the Xypex Admix samples showed no leakage, and water penetration of only 1.5 mm after 120 hours (5 days).

**U.S. Army Corps of Engineers CRD C48-73,**  
**"Permeability of Concrete", Setsco Services,**  
**Pte Ltd., Singapore**

Six Xypex Admix-treated and six untreated concrete samples were tested for water permeability. Pressure was gradually increased over five days and then maintained at 7 bars (224 ft. water head) for 10 days. While the six reference samples showed water leakage beginning on the fifth day and increasing throughout the test period, the Xypex Admix samples showed no water leakage at any time during the test.

**DIN 1048, "Water Impermeability of Concrete",**  
**DICTU S.A., Dept. of Engineering and Construction**  
**Mgt., Santiago, Chile**

Concrete samples 120 mm thick containing Xypex Admix were tested with the same size reference samples for water impermeability. Samples were subjected to pressure for 28 days. Water totally permeated the untreated samples but no water penetration was detected in any of the Xypex Admix-treated samples.

### COMPRESSIVE STRENGTH

**ASTM C 39, "Compressive Strength of Cylindrical Concrete Specimens", HBT Agra, Vancouver, Canada**

Concrete samples containing Xypex Admix at various dosage rates (1%, 2% and 5%) were tested against an untreated concrete control sample. Compressive strength test results after 28 days indicated a significant strength increase in the samples incorporating Xypex Admix. The compressive strength increase varied between 5% and 20% (depending on the Xypex Admix dosage rate) over that of the reference sample.

**ASTM C 39, "Compressive Strength of Cylindrical Concrete Specimens", Kleinfelder Laboratories,**  
**San Francisco, USA**

At 28 days, the compressive strength test of the concrete containing Xypex Admix measured 7160 psi as compared to the reference sample at 6460 psi (a 10% increase).

### CHEMICAL RESISTANCE

**JIS, "Chemical Durability Test", Japanese Utility Company, In-house Test Report, Tokyo, Japan**

Concrete samples containing Xypex Admix were tested against five samples containing other admixtures and against a control sample, to determine resistance to corrosion and deterioration caused by contact with aggressive chemicals. All samples were soaked in a 5% sulfuric acid solution at 20°C for six months. Various evaluations and measurements were assessed every month during the test period, including: photographic comparisons, relative dynamic modulus of elasticity, percentage change in length, weight and flexural rigidity. Although the Xypex Admix sample was subjected to acid conditions well outside its published range, the results confirmed Xypex with the best performance among the seven samples tested.

#### "Sulfuric Acid Resistance Test"

**Aviles Engineering Corporation, Houston, USA**

Concrete samples containing Xypex Admix at different dosage rates (3%, 5% and 7%) were tested against untreated control samples for sulfuric acid resistance. After immersion in the sulfuric acid, each sample was tested for weight loss on a daily basis until a weight



loss of 50% or a definite response trend was obtained. The percentage weight loss of the samples containing Xypex Admix tested significantly lower than the control samples.

***“Sulphate Resistance Test”,  
Taywood Engineering Ltd., Perth, Australia***

Xypex Admix-treated concrete samples were immersed in an ammonium-sulphate solution and tested for “resistance in a harsh environment”. The performance of the Xypex crystalline technology was compared with five other concretes, including one containing a sulphate-resistant cement. Each of the test samples was cured for seven days and then placed in an ammonium-sulphate solution (132 g/litre) for 180 days. The rate of corrosion was determined by measuring weight loss, and length change was noted on a weekly basis. The Xypex crystalline technology substantially improved concrete performance as compared to the reference concrete and tested very similar to the sulphate-resistant concrete. The Xypex Admix-treated samples also provided the highest level of protection as measured by change in length.

**FREEZE/THAW DURABILITY**

***ASTM C 666, “Freeze/Thaw Durability”,  
Independent Laboratory, Cleveland, USA***

After 300 freeze/thaw cycles, the Xypex Admix-treated samples indicated 94% relative durability.

**POTABLE WATER EXPOSURE**

***NSF 61, “Drinking Water System Component-  
Health Effects”, NSF International, Ann Arbor, USA***

Exposure testing of potable water in contact with Xypex-treated samples indicated no harmful effects.

## Directions for Use

Xypex Admix C-2000 must be added to the concrete at the time of batching. The sequence of procedures for addition will vary according to the type of batch plant operation and equipment:

### 1. READY MIX PLANT - DRY BATCH OPERATION

Add Xypex Admix in powder form to the drum of the ready-mix truck. Drive the ready-mix truck under the batch plant and add the balance of the materials in accordance with standard concrete batching prac-

tices. Mix materials for a minimum of 5 minutes to ensure that the Xypex Admix has been thoroughly dispersed throughout the concrete.

### 2. READY MIX PLANT - CENTRAL MIX OPERATION

Mix Xypex Admix with water to form a very thin slurry (e.g. 15 - 20 lb./6.75 - 9 kg of powder mixed with 3 U.S. gallons/13.6 litres of water). Pour the required amount of material into the drum of the ready-mix truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready-mix truck). Pour the Admix slurry into the truck and mix for at least 5 minutes to ensure even distribution of the Xypex Admix throughout the concrete.

**3. PRECAST BATCH PLANT** Add Xypex Admix to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

**NOTE:**

i. It is important to obtain a homogeneous mixture of Xypex Admix with the concrete. Therefore, do not add dry Admix powder directly to wet concrete as this may cause clumping and thorough dispersion will not occur.

ii. Concrete containing the Xypex Admix does not preclude the requirement for design of crack control, construction joint detailing and measures for repairing defects in concrete (i.e. honeycombing, tie holes, cracks beyond specified limits).

For further information regarding the proper use of Xypex Admix for a specific project, consult with a Xypex technical services representative.

## Setting Time and Strength

The setting time of concrete is affected by the chemical and physical composition of ingredients, temperature of the concrete and climatic conditions. Xypex Admix C-2000 is designed for projects where extended retardation is required due to high ambient temperatures or long ready-mix delivery times. Concrete contain-

ing Xypex Admix C-2000 may develop higher ultimate strengths than plain concrete. Trial mixes should be carried out under project conditions to determine the setting time and strength of the concrete dosed with Xypex Admix C-2000. Consult with a Xypex technical services representative for the most appropriate Xypex Admix for your project.

other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.

### Limitations

When incorporating Xypex Admix, the temperature of the concrete mix should be above 40°F (4°C).

### Technical Services

For more instructions, alternative installation methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

### Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

### Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all

## XYPEX CONCENTRATE DS-1

DAT-DS1 • REV-07-04



### Concrete Waterproofing

**07160**

### Cementitious Crystalline

### Description

Xypex Concentrate is a unique chemical treatment for the waterproofing and protection of concrete. XYPEX CONCENTRATE DS-1 is a special formulation designed specifically for a dry shake application on horizontal concrete surfaces. Packaged in the form of a dry powder compound, Concentrate DS-1 consists of Portland cement, various active proprietary chemicals, and an aggregate which has been crushed and graded to particle sizes suitable for concrete floors. DS-1 becomes an integral part of the concrete surface thereby eliminating problems normally associated with coatings (e.g. scaling, dusting, flaking and delamination). The active chemicals react with the moisture of the fresh concrete causing a catalytic reaction which generates a non-soluble crystalline formation within the pores and capillary tracts of the concrete.

### Recommended for:

- Sewage and Water Treatment Plants
- Reservoirs
- Foundation Slabs
- Bridge Decks
- Below-grade Parking Structures

**NOTE:** For concrete surfaces that are subject to heavy traffic conditions or that require increased resistance to impact and abrasion, please consult with a Xypex technical services representative regarding the use of Xypex Concentrate DS-2.

### Advantages

- Resists extreme hydrostatic pressure from either positive or negative surface of the concrete slab
- Becomes an integral part of the substrate
- Highly resistant to aggressive chemicals
- Can seal hairline cracks up to 0.4 mm
- Allows concrete to breathe

- Non-toxic
- Less costly to apply than most other methods
- Permanent
- Increases flexibility in the construction schedule

### Packaging

Xypex Concentrate DS-1 is available in 60 lb. (27.2 kg) pails.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

### Coverage

Under normal conditions, the coverage rate for Xypex Concentrate DS-1 is 1.75 lb./sq. yd. (0.95 kg/m<sup>2</sup>).

### Test Data

#### PERMEABILITY

**U.S. Army Corps of Engineers CRD C48-73, "Permeability of Concrete", Pacific Testing Labs, Seattle, USA**

Two in. (51 mm) thick, 2000 psi (13.8 MPa) Xypex-treated concrete samples were pressure tested up to a 405 ft. (124 m) water head (175 psi/1.2 MPa), the limit of the testing apparatus. While untreated samples showed marked leakage, the Xypex-treated samples (as a result of the crystallization process) became totally sealed and exhibited no measurable leakage.

**DIN 1048, "Water Impermeability of Concrete", Bautest – Corporation for Research & Testing Building Materials, Augsburg, Germany**

Twenty cm thick Xypex-treated concrete samples were pressure tested up to 7 bars (230 ft./70 m water head) for 24 hours to determine water impermeability. While the reference specimens measured water penetration up to a depth of 92 mm, Xypex-treated samples measured water penetration of zero to an average of 4 mm.

**ÖNORM B 3303, "Water Impermeability of Concrete", Technologisches Gewerbemuseum, Federal Higher Technical Education & Research Institute, Vienna, Austria**

Xypex-treated concrete samples were pressure tested to a maximum 7 bars (230 ft./70 m water

## XYPEX CONCENTRATE DS-1

head) for 10 days. Test revealed that while 25 ml of water had penetrated the untreated concrete samples, zero ml had penetrated the Xypex-treated samples. Test specimens were then broken and showed water penetration to a depth of 15 mm on untreated samples but no measurable water penetration on the Xypex-treated samples.

**CSN 1209/1321, "Impermeability and Resistance to Pressurized Water", Institute of Civil Engineering, Technology and Testing, Bratislava, Slovak Republic**

Xypex-treated and untreated concrete samples were exposed to 1.2 MPa of pressure to determine water permeability. Results showed the Xypex-treated samples provided effective protection against hydrostatic water pressure. Treated and untreated samples were also subjected to contact with silage juices and various petroleum products (e.g. diesel oil, transformer oil, gasoline) at 14 kPa for 28 days. The Xypex-treated samples significantly reduced the penetration of these solutions.

### CHEMICAL RESISTANCE

**ASTM C 267-77, "Compressive Resistance to Mortars", Pacific Testing Labs, Seattle, USA**

Xypex-treated cylinders and untreated cylinders were exposed to hydrochloric acid, caustic soda, toluene, mineral oil, ethylene glycol, pool chlorine and brake fluid and other chemicals. Results indicated that chemical exposure did not have any detrimental effects on the Xypex coating. Tests following chemical exposure measured an average 17% higher compressive strength in the Xypex-treated specimens over the untreated control samples.

**IWATE University Technical Report, "Resistance to Acid Attack", Tokyo, Japan**

Xypex-treated mortar and untreated mortar were measured for acid resistance after exposure to a 5%  $H_2SO_4$  solution for 100 days. Xypex suppressed concrete erosion to 1/8 of the reference samples.

### FREEZE/THAW DURABILITY

**ASTM C 672, "Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to De-Icing Chemicals", Twin City Testing Lab, St. Paul, USA**

Xypex-treated samples restricted chloride ion concentration to below the level necessary to promote

electrolytic corrosion of reinforcing steel. Visual examination of untreated panels after 50 freeze/thaw cycles showed a marked increase in surface deterioration compared to Xypex-treated samples.

**JIS A 6204, "Concrete Freeze/Thaw", Japan Testing Center for Construction Materials, Tokyo, Japan**

The resonating frequency of both untreated and Xypex-treated concrete samples were measured throughout 435 freeze/thaw cycles. At 204 cycles, the Xypex-treated samples showed 96% relative durability compared to 90% in the untreated samples. At 435 cycles, the Xypex-treated samples measured 91% relative durability compared to 78% in the untreated reference samples.

## Application Procedures

1. Fresh concrete is placed, consolidated and levelled.
2. Wait until concrete can be walked on leaving an indentation of 1/4 - 3/8 in. (6.5 - 9.5 mm). Concrete should be free of bleed water and be able to support the weight of a power trowel. Then, float open the surface.
3. Immediately after floating open the surface, apply the dry shake material by hand or mechanical spreader. The dry shake material must be spread evenly.
4. As soon as the dry shake material has absorbed moisture from the base slab, it must be floated into the surface. The DS-1 powder must be thoroughly worked into the cement paste using a float (not a trowel). Failure to utilize a float for this process could result in damage to the hardened surface (i.e. flaking, blistering or peeling).
5. When concrete has hardened sufficiently, power trowel surface to the required finish.

### NOTE:

- i. Environmental conditions (e.g. hot or cold temperatures) may affect the application and installation of the dry shake powder. In hot, dry or windy conditions where evaporation of bleed water is occurring, the DS-1 powder should be applied immediately after



## XYPEX CONCENTRATE DS-1

Step 1 above (i.e. screeding). Keep top of slab from premature drying to ensure homogeneous mixture of DS-1 powder into concrete paste. It is advisable to use an evaporation retardant on the fresh concrete.

ii. It is common that edges of a slab wall will set up earlier than the main body of concrete. Such edge areas can be dry shaken and finished with hand tools prior to proceeding with application to the main body of concrete.

iii. Consult with Xypex's Technical Services Department or your local Xypex representative regarding the optimum concrete performance under a variety of conditions during application of DS-1.

### Curing

Curing is important and should begin as soon as final set has occurred but before surface starts to dry. Conventional moist curing procedures such as water spray, wet burlap or plastic covers may be used. Curing should continue for at least 48 hours. In hot, dry, sunny conditions, consult manufacturer for specific instructions. In lieu of moist curing, concrete sealers and curing compounds meeting ASTM C 309 may be used.

### Note

1. For best results when applying dry shake materials, the air content of the concrete should not exceed 3% (a high air content can make it difficult to achieve a proper application). If a higher entrained air content is specified (e.g. for concrete that will be exposed to freezing and thawing), contact the Technical Services Department of Xypex Chemical Corporation for further application information.

2. Chronic moving cracks or joints will require a suitable flexible sealant.

3. For certain concrete mix designs, we recommend a test panel be produced and evaluated for finishing. For example, higher performance concrete with a low water/cement ratio, air entrainment, superplasticizers, or silica fume may reduce bleed water and make the concrete more difficult to finish.

4. For increased abrasion resistance, spray-apply Xypex Quickset following curing of the DS-1 application. The Xypex Quickset mix ratio is one part Quickset to one part water by volume. The recommended coverage rate is 150 ft.<sup>2</sup>/U.S. gallon (14 m<sup>2</sup>/litre).

### Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

### Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

### Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.

## XYPEX CONCENTRATE DS-2

DAT-DS2 • REV-07-04



### Concrete Waterproofing

**07160**

### Cementitious Crystalline

### Description

Xypex Concentrate is a unique chemical treatment for the waterproofing and protection of concrete. XYPEX CONCENTRATE DS-2 is a special formulation designed specifically for a dry shake application on horizontal concrete surfaces where greater resistance to impact and abrasion is required. Packaged in the form of a dry powder compound, Concentrate DS-2 consists of Portland cement, various active proprietary chemicals, and a synthetic aggregate hardener which has been crushed and graded to particle sizes suitable for concrete floors. DS-2 becomes an integral part of the concrete surface thereby eliminating problems normally associated with coatings (e.g. scaling, dusting, flaking and delamination). The active chemicals react with the moisture of the fresh concrete causing a catalytic reaction which generates a non-soluble crystalline formation within the pores and capillary tracts of the concrete.

### Recommended for:

- Sewage and Water Treatment Plants
- Traffic Bearing Surfaces
- Warehouse Floors
- Foundation Slabs
- Below-grade Parking Structures

### Advantages

- Resists extreme hydrostatic pressure from either positive or negative surface of the concrete slab
- Becomes an integral part of the substrate
- Highly resistant to aggressive chemicals
- Can seal hairline cracks up to 0.4 mm
- Allows concrete to breathe
- Non-toxic
- Less costly to apply than most other methods

- Permanent
- Increases flexibility in the construction schedule

### Packaging

Xypex Concentrate DS-2 is available in 60 lb. (27.2 kg) pails and bags.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

### Coverage

Under normal conditions, the coverage rate for Xypex Concentrate DS-2 is 6.75 - 7.5 lb./sq. yd. (3.6 - 4.0 kg/m<sup>2</sup>), depending on the degree of abrasion resistance required.

**NOTE:** Under heavy traffic conditions or where even greater abrasion resistance is required, consult with a Xypex technical services representative for a recommendation that meets your specific need.

### Test Data

#### PERMEABILITY

**U.S. Army Corps of Engineers CRD C48-73, "Permeability of Concrete", Pacific Testing Labs, Seattle, USA**

Two in. (51 mm) thick, 2000 psi (13.8 MPa) Xypex-treated concrete samples were pressure tested up to a 405 ft. (124 m) water head (175 psi/1.2 MPa), the limit of the testing apparatus. While untreated samples showed marked leakage, the Xypex-treated samples (as a result of the crystallization process) became totally sealed and exhibited no measurable leakage.

**DIN 1048, "Water Impermeability of Concrete", Bautest – Corporation for Research & Testing Building Materials, Augsburg, Germany**

Twenty cm thick Xypex-treated concrete samples were pressure tested up to 7 bars (230 ft./70 m water head) for 24 hours to determine water impermeability. While the reference specimens measured water penetration up to a depth of 92 mm, Xypex-treated samples measured water penetration of zero to an average of 4 mm.

**ÖNORM B 3303, "Water Impermeability of Concrete", Technologisches Gerwerbemuseum, Federal Higher Technical Education & Research Institute, Vienna, Austria**

Xypex-treated concrete samples were pressure tested to a maximum 7 bars (230 ft./70 m water head) for 10 days. Test revealed that while 25 ml of water had penetrated the untreated concrete samples, zero ml had penetrated the Xypex-treated samples. Test specimens were then broken and showed water penetration to a depth of 15 mm on untreated samples but no measurable water penetration on the Xypex-treated samples.

**CSN 1209/1321, "Impermeability and Resistance to Pressurized Water", Institute of Civil Engineering, Technology and Testing, Bratislava, Slovak Republic**

Xypex-treated and untreated concrete samples were exposed to 1.2 MPa of pressure to determine water permeability. Results showed the Xypex-treated samples provided effective protection against hydrostatic water pressure. Treated and untreated samples were also subjected to contact with silage juices and various petroleum products (e.g. diesel oil, transformer oil, gasoline) at 14 kPa for 28 days. The Xypex-treated samples significantly reduced the penetration of these solutions significantly.

**CHEMICAL RESISTANCE**

**ASTM C 267-77, "Compressive Resistance to Mortars", Pacific Testing Labs, Seattle, USA**

Xypex-treated cylinders and untreated cylinders were exposed to hydrochloric acid, caustic soda, toluene, mineral oil, ethylene glycol, pool chlorine and brake fluid and other chemicals. Results indicated that chemical exposure did not have any detrimental effects on the Xypex coating. Tests following chemical exposure measured an average 17% higher compressive strength in the Xypex-treated specimens over the untreated control samples.

**IWATE University Technical Report, "Resistance to Acid Attack", Tokyo, Japan**

Xypex-treated mortar and untreated mortar were measured for acid resistance after exposure to a 5% H<sub>2</sub>SO<sub>4</sub> solution for 100 days. Xypex suppressed concrete erosion to 1/8 of the reference samples.

**FREEZE/THAW DURABILITY**

**ASTM C 672, "Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to De-Icing Chemicals", Twin City Testing Lab, St. Paul, USA**

Xypex-treated samples restricted chloride ion concentration to below the level necessary to promote electrolytic corrosion of reinforcing steel. Visual examination of untreated panels after 50 freeze/thaw cycles showed a marked increase in surface deterioration compared to Xypex-treated samples.

**JIS A 6204, "Concrete Freeze/Thaw", Japan Testing Center for Construction Materials, Tokyo, Japan**

The resonating frequency of both untreated and Xypex-treated concrete samples were measured throughout 435 freeze/thaw cycles. At 204 cycles, the Xypex-treated samples showed 96% relative durability compared to 90% in the untreated samples. At 435 cycles, the Xypex-treated samples measured 91% relative durability compared to 78% in the untreated reference samples.

**ABRASION RESISTANCE**

**ASTM C 501-84, "Taber Abrasion", AGRA Earth & Environment Ltd./James Neill & Associates, Vancouver, Canada**

Since 1978 various tests have been performed on concrete specimens containing the non-metallic/synthetic hardener utilized in Xypex DS-2. Testing included the evaluation of concrete specimens for abrasion resistance as measured by mass loss (Taber Abrasion). The concrete control samples used in the tests exhibited an average mass loss of 6.0 grams, while subsequent taber abrasion testing of concrete treated with Xypex DS-2 showed a mass loss of 3.3 grams. Xypex Quickset was then applied to samples treated with Xypex DS-2 and mass loss was further reduced to 2.2 grams. Test results indicate that use of Xypex DS-2 significantly improves the abrasion resistance of concrete.

**Application Procedures**

1. Fresh concrete is placed, consolidated and levelled.
2. Wait until concrete can be walked on leaving an indentation of 1/4 - 3/8 in. (6.5 - 9.5 mm). Concrete

## XYPEX CONCENTRATE DS-2

should be free of bleed water and be able to support the weight of a power trowel. Then, float open the surface.

3. Immediately after floating open the surface, apply one-half of the dry shake material by hand or mechanical spreader. The dry shake material must be spread evenly.

4. As soon as the dry shake material has absorbed moisture from the base slab, it must be floated into the surface. The DS-2 powder must be thoroughly worked into the cement paste using a float (not a trowel). Failure to utilize a float for this process could result in damage to the hardened surface (i.e. flaking, blistering or peeling).

5. Immediately after power floating, apply remaining dry shake material at right angles to the first application.

6. Allow remaining dry shake material to absorb moisture from the base slab and then power float the material into the surface. Again, it is essential that the DS-2 powder is thoroughly worked into the cement paste using a float (not a trowel).

7. When concrete has hardened sufficiently, power trowel surface to the required finish.

### NOTE:

i. Environmental conditions (e.g. hot or cold temperatures) may affect the application and installation of the dry shake powder. In hot, dry or windy conditions where evaporation of bleed water is occurring, the DS-2 powder should be applied immediately after Step 1 above (i.e. screeding). Keep top of slab from premature drying to ensure homogeneous mixture of DS-2 powder into concrete paste. It is advisable to use an evaporation retardant on the fresh concrete.

ii. It is common that edges of a slab wall will set up earlier than the main body of concrete. Such edge areas can be dry shaken and finished with hand tools prior to proceeding with application to the main body of concrete.

iii. Consult with Xypex's Technical Services Department or your local Xypex representative regarding the opti-

mum concrete performance under a variety of conditions during application of DS-2.

### Curing

Curing is important and should begin as soon as final set has occurred but before surface starts to dry. Conventional moist curing procedures such as water spray, wet burlap or plastic covers may be used. Curing should continue for at least 48 hours. In hot, dry, sunny conditions, consult manufacturer for specific instructions. In lieu of moist curing, concrete sealers and curing compounds meeting ASTM C 309 may be used.

### Note

1. For best results when applying dry shake materials, the air content of the concrete should not exceed 3% (a high air content can make it difficult to achieve a proper application). If a higher entrained air content is specified (e.g. for concrete that will be exposed to freezing and thawing), contact the Technical Services Department of Xypex Chemical Corporation for further application information.

2. Chronic moving cracks or joints will require a suitable flexible sealant.

3. For certain concrete mix designs, we recommend a test panel be produced and evaluated for finishing. For example, higher performance concrete with a low water/cement ratio, air entrainment, superplasticizers, or silica fume may reduce bleed water and make the concrete more difficult to finish.

4. To further enhance the surface, spray-apply Xypex Quickset following curing of the DS-2 application. The Xypex Quickset mix ratio is one part Quickset to one part water by volume. The recommended coverage rate is 150 ft.<sup>2</sup>/U.S. gallon (14 m<sup>2</sup>/litre).

### Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

## Safe Handling Information

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## Warranty

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## Concrete Waterproofing

### 03010

## Patching & Resurfacing

### Description

XYPEX PATCH'N PLUG is a specially designed, fast-setting, non-shrink, high-bond-strength, hydraulic cement compound for concrete patching and repair. Patch'n Plug stops flowing water in seconds and is used to seal cracks, tie holes, and other defects in concrete. The high performance characteristics of Patch'n Plug are enhanced by Xypex's unique crystalline waterproofing technology.

### Recommended for:

- Stopping an active flow of water through cracks
- Repair of concrete substrates before the application of Xypex coating materials

### Advantages

- Single component (simply add water)
- Fast setting: two to three minutes at 70°F (21°C)
- Excellent structural strength
- As durable as the masonry and concrete to which it is applied
- Non-metallic (won't rust or deteriorate)
- Non-toxic

### Packaging

Xypex Patch'n Plug is available in 20 lb. (9.1 kg) pails and 60 lb. (27.2 kg) pails.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

### Coverage

One 60 lb. (27.2 kg) pail of Xypex Patch'n Plug will produce 0.54 cubic feet (0.0154 cu. metres) of mortar.

### Test Data

Physical Property	Test Method	Typical Result	
Compressive Strength	ASTM C109	psi	MPa
@ 24 hours		2100	14.3
@ 7 days		3100	21.3
@ 28 days		4500	31.0
Setting Time	ASTM C266	min.	sec.
Initial Set		3	50
Final Set		9	10
Tensile Bond Pull-Off	CSA A23.2-6B	psi	MPa
		120	0.8

**NOTE:** Samples prepared with 1 part water to 3.25 parts dry powder by volume (1 part water to 4 parts dry powder by mass). Setting time was determined using Gilmore needles.

### Plugging Instructions

**1. PREPARATION** Rout out crack or hole by chiseling or chipping to a minimum depth of one inch (25 mm). Form a square or dovetail shaped space (do not use a "V" cut). Flush away all loose materials and dirt from the cavity with water and a stiff brush.

**2. MIXING** Add 1 part water to 3.5 parts Patch'n Plug by volume and mix to the consistency of a stiff putty. Do not mix more than can be used in 3 minutes. For best results, water temperature should be approximately 60 - 70°F (15 - 20°C).

**3. PLUGGING** Form plug with gloved hand. Place plug into cavity pressing firmly until plug is hard. When sealing cracks, begin at the highest point and work down.

**NOTE:** Where there is a high volume of water flow due to extreme hydrostatic pressure, a bleeder hose may be necessary to relieve the water pressure while sealing the repair area. (See procedures on reverse side.)

### Follow These Steps:

- With a concrete chisel and hammer (or chipping gun), cut open a cavity at the point of greatest water flow.

b. Place a stiff section of hose or pipe into the cavity and secure in place with Patch'n Plug to force water through the hose. This relieves the pressure so that the area can be patched. Allow a minimum of 24 hours for hardening.

c. Remove bleeder hose and plug remaining hole. If necessary, reduce water flow by inserting steel wool or wooden plug in the remaining hole before patching.

### Patching Instructions

**1. SURFACE PREPARATION** Rout out faulty concrete until sound substrate is reached. Remove all loose materials from area and saturate with clean water. Allow water to be absorbed into the concrete, then remove excess water.

**2. MIXING** For fast repairs to concrete or masonry, add water to Patch'n Plug powder (1.5 parts water to 4 parts powder by volume). Mix to a workable mortar consistency and trowel on as required. For large repairs, mix 1 part Patch'n Plug with 2 parts mason sand or small aggregate (3/8 in. or 10 mm minus crushed stone). Maximum ratio is 40 lb. (18.2 kg) stone to one 60 lb. pail (27.2 kg) of Patch'n Plug.

### Abnormal Temperatures

During above normal ambient temperatures, mixing water should not exceed 90°F (32°C) and Xypex Patch'n Plug material should not exceed 70°F (21°C). Below normal ambient temperatures will retard the setting time of Patch'n Plug. In this situation, Xypex materials should be stored at normal temperatures (see Storage) and mixing water should be heated to increase setting speed.

### Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

### Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

### Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.



### Concrete Rehabilitation

**03930**

### Patching & Resurfacing

### Description

XYPEX MEGAMIX I is a thin parge coat for the waterproofing and resurfacing of vertical masonry or concrete surfaces, as a cap coat for Xypex Concentrate, or as an architectural rendering. Megamix I is a unique blend of Portland cement, treated silica sand, fibers and proprietary chemicals. It is mixed with Xycrylic Admix to produce enhanced bond. Megamix I is applied by brush or trowel up to a thickness of 3/8 in. (10 mm). The high performance characteristics of Megamix I are enhanced by Xypex's unique crystalline waterproofing and protection technology.

**NOTE:** For patching or resurfacing deteriorated concrete, requiring a thicker parge coat, (between 3/8 in. and 2 in. or 10 - 50 mm), refer to the product data sheet for Xypex Megamix II.

### Recommended for:

- Waterproof coating for vertical concrete block surfaces and cast-in-place concrete walls
- A secondary or cap coat for Xypex Concentrate applications to porous masonry surfaces
- Lining for swimming pools, tunnels and tanks

### Advantages

- Excellent adhesion and bond to concrete substrates
- Easy to apply
- Fiber reinforced
- Reduces surface absorption
- Provides good surface for painting or as a final finished surface
- NSF 61 certified

### Packaging

Megamix I is available in 60 lb. (27.2 kg) pails.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year.

### Coverage

Required coating thickness will vary depending on project requirements. At the recommended thickness of 1/8 in. (3.2 mm), one 60 lb. (27.2 kg) pail of Megamix I will cover 47.5 sq. ft. (4.4 m<sup>2</sup>). Megamix I may be applied as thin as 1/16 in. (1.6 mm) provided it is used as a cap coat over a coat of Xypex Concentrate (24 hours between coats is preferable). For application thickness exceeding 3/8 in. (10 mm), consult with the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

### Physical Properties

Mixing Liquid Required (2 water:1 part Xycrylic)		
1.4 U.S. gallon / 60 lb. pail 5.4 litre / 27.2 kg pail		
Compressive Strength (ASTM C 109)		
@ 7 days	2420 psi	16.7 MPa
@ 28 days	3610 psi	24.9 MPa
Direct Tensile Bond Strength (ACI 503R Appendix A)		
concrete block	220 psi	1.54 MPa
24 hr. Concentrate	180 psi	1.24 MPa
Water Permeability and Absorption CSN 73 2578 "Test for Water-Tightness of Surface Finishes of Building Materials"		
30 min. water absorption (% of untreated concrete block)	86.8% reduction	

**NOTE:** For bond and absorption tests, Megamix I was applied at 1/16 in. (1.6 mm) thick onto either pressure washed concrete block or 24 hr. old Xypex Concentrate.

### Application Procedures

**1. SURFACE PREPARATION** The concrete surface to be treated with Megamix I must be clean and free from dirt, oil, paint, or other foreign substances that could hinder bond. Structural repairs (i.e. cracks, faulty construction joints, rock pockets, tie holes,

spalled concrete, etc.) should be performed prior to the application of the Megamix I coating. Pressure washing of surface may be required to ensure open capillary system to provide "tooth and suction" for the Megamix I coating.

**2. WETTING CONCRETE SURFACE** The concrete or masonry surface must be thoroughly saturated with clean water to control substrate suction and prevent premature drying out of the Megamix I coating.

**3. MIXING PROCEDURES** Prepare the mixing liquid by combining 1 part Xycrylic Admix with 2 parts clean water. Then, mix 1.4 U.S. gallons (5.4 litres) of the mixing liquid with one 60 lb. (27.2 kg) pail of Megamix I powder. Mix thoroughly to a creamy consistency that is suitable for either a brush or trowel application. Let mixture stand for 3 - 5 minutes, re-agitate and then apply.

**4. APPLYING MEGAMIX I** Ensure surface is "saturated, surface dry" (SSD) just prior to application. Brush or trowel apply Megamix I to the surface at the rate of 0.6 - 1.3 lb./sq. ft. (2.9 - 6.4 kg/m<sup>2</sup>). This coverage rate will produce a coating of between 1/16 in. and 1/8 in. (1.6 - 3.2 mm) thick depending on the porosity of the substrate. For spray application contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative for specific details.

For applications such as concrete block walls where Xypex Concentrate is to be used as the initial coat in a two-coat system, the Concentrate coating should be installed as per the manufacturer's standard instructions. Megamix I should then be applied over the Concentrate coating while the Concentrate is still "green" (i.e. following initial set/approximately 2 - 4 hours). The Megamix I coating should not be applied later than 24 hours after the application of Xypex Concentrate.

**5. CURING** When used with Xycrylic Admix as specified above, Megamix I should not require any further curing. However, if weather conditions result in rapid evaporation (such as very hot or windy), then a

fine mist of water should be sprayed on the coating 2 - 3 times for one day.

## Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

## Safe Handling Information

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## Warranty

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## Concrete Rehabilitation

**03930**

## Patching & Resurfacing

### Description

XYPEX MEGAMIX II is a thick repair mortar for the patching and resurfacing of deteriorated concrete. Megamix II has been specifically formulated to produce superior bond, low shrinkage, chemical durability and high strength. It is a one component mortar and can be either sprayed or trowel applied at a thickness of 3/8 - 2 in. (10 - 50 mm). The high performance characteristics of Megamix II are enhanced by Xypex's unique crystalline waterproofing and protection technology.

**NOTE:** For rehabilitation applications, where a thin parge coating (less than 3/8 in. or 10 mm) or a cap coat for Xypex Concentrate is required, refer to the product data sheet for Megamix I.

### Recommended for the Rehabilitation of:

- Water Tanks and Reservoirs
- Sewage Treatment Plants
- Concrete Water and Sewer Pipes
- Manholes and Vaults
- Marine Structures
- Bridge Structures
- Tunnels and Parking Garages

### Advantages

- Excellent adhesion and bond to concrete substrates
- Low shrinkage, fiber reinforced
- Low chloride penetration
- Ready to use – just add water
- Vertical and overhead concrete repair; sprayable
- VOC compliant
- NSF 61 certified

### Packaging

Megamix II is available in 55 lb. (25 kg) bags, 60 lb. (27.2 kg) pails, or in customized packaging to meet your specific requirements.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year.

### Coverage

At 1/2 in. (12.5 mm) thickness, each 55 lb. (25 kg) bag of Megamix II will cover 11.3 sq. ft. (1.05 m<sup>2</sup>), or each 60 lb. (27.2 kg) pail will cover 12.3 sq. ft. (1.14 m<sup>2</sup>).

### Physical Properties

Compressive Strength (ASTM C 109)		
@ 24 hrs	3080 psi	21.2 MPa
@ 3 days	5515 psi	38.0 MPa
@ 7 days	6845 psi	47.2 MPa
@ 28 days	8600 psi	59.3 MPa
Flexural Strength (ASTM C 78)		
@ 28 days	1190 psi	8.2 MPa
Splitting Tensile Strength (ASTM C 496)		
@ 28 days	603 psi	4.2 MPa
Direct Tensile Bond Strength to Concrete (ACI 503R Appendix A)		
@ 90 days	330 psi	2.3 MPa
Rapid Chloride Permeability (ASTM C 1202)		
@ 28 days	572 coulombs	
@ 90 days	420 coulombs	
Scaling Resistance (ASTM C 672)		
50 cycles	no scaling	
Chemical Resistance (ASTM C 267)		
mass loss (84 days)	negligible (retained 99.78% mass)	
Setting Time (ASTM C 266)		
initial	4:10 hrs:min	
final	7:10 hrs:min	
Note: Testing completed @ 14% water content of the mass of the dry ingredients.		



## Application Procedures

**1. SURFACE PREPARATION** Remove loose, delaminated or unsound concrete by high pressure water blast, chipping, or other means. Complete structural or reinforcing steel corrosion repairs as necessary. Saw cut perimeter of repair area to 3/8 in. (10 mm) depth. Remove dust, micro fractured particles and foreign material from the repair area by pressure washing or other suitable means necessary to clean surface and obtain desired bond.

**2. MIXING PROCEDURES** Best results are achieved using a mechanical mortar mixer and paddle with a capacity for low speed continuous blending. For small quantities of material a paddle mixer can be substituted. Mix requires 0.92 - 0.96 US gallons of water per 55 lb bag or 1.00 - 1.05 US gallons per 60 lb pail (3.5 - 3.7 litres per 25 kg bag or 3.8 - 4.0 litres per 27.2 kg pail). Use only clean water. Add approximately 90% of the required amount of water to a mixer and then add the Megamix II powder. Mix briefly and add additional water to achieve the required consistency (do not exceed maximum water without consulting Xypex Technical Representative). Mix 3 - 5 minutes to achieve a uniform consistency. Over mixing or delivery delays may result in product stiffening. Do not over water.

**3. APPLYING MEGAMIX II** Saturate the repair area with clean water and allow the surface to come to a "saturated, surface dry" (SSD) condition. Maintain concrete substrate in this condition during the application process. For improved bond, apply scrub coat of Megamix II onto prepared surface using a stiff bristle brush. Apply full coat of Megamix II while scrub coat is still wet (generally within 20 minutes). When applying Megamix II by low pressure spray equipment, use sufficient velocity to compact and build the thickness of the mortar. The spray nozzle should have a minimum 0.5 in. (12.5 mm) orifice to prevent clogging. Spray-apply Megamix II, at a right angle to surface, at a distance of 18 - 24 in. (450 - 600 mm). Complete finishing operations as quickly as possible. Megamix II can be finished to varying surface textures, including a rough finish directly

from spraying nozzle, to semi-smooth using a wood or rubber float or smooth using a steel trowel.

### NOTE:

i. For a recommendation regarding the specific type of equipment required for the mixing and for the spray application of Megamix II, please contact the Technical Services Department of Xypex Chemical Corporation.

ii. An application of Xypex Concentrate may be specified by an engineer or design authority to provide enhanced waterproofing and chemical protection in extremely harsh conditions.

iii. Xypex Concentrate should be applied onto the Megamix II surface immediately following moist curing (i.e. 3 days). Ensure that the Megamix surface is rough or scored and saturated to provide "tooth and suction" for the Xypex coating.

iv. Megamix II can be extended with a maximum of 30 lbs. (13.6 kg) clean 3/8" (10mm) coarse aggregate per 55 lbs. (25 kg) container.

**4. APPLICATION THICKNESS** The thickness of the Megamix II application will depend on specific job site conditions and requirements. As a general guide, application thickness should be between 3/8 in. and 2 in. (10 mm and 50 mm). Single layer thickness for spray application will depend on equipment and applicator skill, but may be up to 2 in. (50 mm) vertical and 1.5 in. (40 mm) overhead. Roughen or score the surface before applying successive layers and apply immediately following initial set.

**NOTE:** For any application greater than 2 in. (50 mm) contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

**5. CURING** Curing is essential for optimum quality and durability of the repair mortar. Cure Megamix II using either ASTM C 309 compliant curing compounds or by moist curing methods. For moist curing, apply continuous source of moisture by spray, or wet burlap and polyethylene sheet or other suitable

means for a minimum of 3 days. Containment structures (i.e. reservoirs, tanks, etc.) can be filled with water following 3 days moist curing of the Megamix II coating.

**NOTE:**

i. In hot, dry, windy weather, special curing procedures may be required prior to final set. This may involve use of fog spray, or suitable curing compounds following finishing.

ii. Megamix II should not be mixed and placed at temperatures below 38°F (3°C) or above 86°F (30°C). Protect from rapid evaporation (hot and/or cold and windy conditions).

of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for the particular purpose and the warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.

## Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

## Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

## Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement



### Concrete Restoration

**03900**

Patching &  
Resurfacing

### Description

XYPEX RESTORA-TOP 50 is one of three Xypex products specifically formulated for the repair and rehabilitation of horizontal concrete surfaces. Xypex Restora-Top 50 is used for the patching or resurfacing of deteriorated concrete up to 1/2 in. (12 mm) thick. It is used on surfaces where light traffic conditions exist. Xypex Restora-Top 50 consists of specially modified Portland cement, aggregates, admixtures and bonding agents combined in controlled proportions to provide excellent adhesion properties as well as reduced shrinkage.

### Recommended for:

- Concrete Floors
- Driveways
- Decks
- Patios
- Steps
- Walkways
- Curbs
- Rain Damaged Slabs
- Levelling Course for Thin Set Mortars

### Advantages

- Excellent adhesion to existing concrete surfaces
- Easy to use – just add water and mix
- Approximately 30 minutes working time
- Contains an integral bonding agent
- Moist curing is not normally required
- Ready for foot traffic in about 2.5 hours
- Suitable for indoor and outdoor use
- VOC compliant

### Limitations

Restora-Top 50 should not be mixed and placed at temperatures below 50°F (10°C) or above 80°F (27°C). Protection from direct sunlight is desirable

under hot or windy conditions. Restora-Top 50 contains a polymer additive to enhance bond. To achieve maximum bond strength, the polymer must be allowed to dry out after the initial setting and curing period. Avoid immersion prior to full curing of Restora-Top 50.

### Packaging

Xypex Restora-Top 50 is available in 55 lb. (25 kg) bags.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C).

### Coverage

At 1/4 in. (6.4 mm) thickness, each 55 lb. (25 kg) bag of Restora-Top 50 will cover 24.8 sq. ft. (2.4 m<sup>2</sup>). For brush or broom applications, the yield will vary with the thickness and texture required. Each 55 lb. (25 kg) bag will cover an area of approximately 105 - 115 sq. ft. (10 - 11 m<sup>2</sup>) for a brush or broom application.

### Physical Properties

Water Requirement		
0.936 U.S. gallons (3.6 litres) per 55 lb. (25 kg) bag		
Flow, ASTM C 230		
	115% - 125%	
Working Time at 68°F (20°C)		
	30 - 40 minutes	
Compressive Strength, CAN3 - A23.2 - 1B		
@ 1 day	2460 psi	17 MPa
@ 7 days	4930 psi	34 MPa
@ 28 days	5510 psi	38 MPa
Tensile Bond Strength to Concrete		
@ 7 days	116 psi	0.8 MPa
@ 28 days	200 psi	1.4 MPa

**NOTE:** Bond strength was determined by direct tensile loading of Restora-Top 50 which had been applied by trowel to a fully cured concrete slab at an average thickness of 1/2 in. (12 mm).

## Application Procedures

1. Remove all laitance, dirt, films, paint, coatings and other foreign matter.
2. Saturate concrete with clean water. Remove any excess surface water and allow surface to partially dry.
3. Place dry powder in a clean mixing container and add water to reach the desired consistency. For trowel application, add 0.936 U.S. gallons (3.6 litres) of water per each 55 lb. (25 kg) bag of powder. For brush or broom applications add extra water (approximately 1.5 pints/700 ml) per 55 lb. (25 kg) bag of powder. Do not mix more Restora-Top 50 than can be applied in 30 minutes.
4. When trowel applying (max. 1/2 in./12 mm thick), work a thin layer into the surface as a primer coat, then build up to the desired thickness and trowel to the desired finish. Avoid over-trowelling. If the thickness is greater than 1/2 in. (12 mm), apply in 1/2 in. (12 mm) layers allowing each layer to cure overnight.
5. When broom applying, first work Restora-Top 50 into the surface with a stiff bristle broom before lightly brooming to obtain an even surface texture.

## Curing

Because of the bonding and water retaining agents included in the mix, Restora-Top 50 does not normally require moist curing or protection. However, when applied in hot or windy conditions, Restora-Top 50 may require protection from rapid moisture loss by lightly spraying with water as necessary or by covering with a sheet of plastic.

## Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

## Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

## Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.



### Concrete Restoration

**03900**

Patching &  
Resurfacing

### Description

XYPEX RESTORA-TOP 100 is one of three Xypex products specifically formulated for the repair and rehabilitation of horizontal concrete surfaces. Xypex Restora-Top 100 is used for patches up to 1 in. (25 mm) thick where rapid setting and strength gain are required. Restora-Top 100 consists of specially modified Portland cement, aggregates, polypropylene fibers, and admixtures combined in controlled proportions. This compound provides excellent adhesion properties, rapid setting and strength gain as well as superior durability and reduced shrinkage.

### Recommended for:

- Concrete Floors
- Parking Decks
- Walkways
- Warehouse Floors
- Bridge Decks
- Roads

### Advantages

- Excellent adhesion to existing concrete surfaces
- Traffic-ready in two to four hours
- Easy to use – just add water and mix
- Rapid set and strength gain
- Suitable for indoor and outdoor use
- VOC compliant

### Limitations

Restora-Top 100 should not be mixed and placed at temperatures below 37°F (3°C) or above 86°F (30°C). Protection from direct sunlight is desirable under hot or windy conditions. Use only as a patching or filling material.

### Packaging

Xypex Restora-Top 100 is available in 55 lb. (25 kg) bags.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C).

### Coverage

At 1 in. (25 mm) thickness, each 55 lb. (25 kg) bag of Restora-Top 100 will cover approximately 5.7 sq. ft. (0.52 m<sup>2</sup>).

### Physical Properties

Setting Time, ASTM C 403		
Initial, at 68°F (20°C)	25 minutes	
Final, at 68°F (20°C)	45 minutes	
Working Time at 68°F (20°C)		
	20 minutes	
Air Content (% of Volume)		
	5%	
Compressive Strength		
@ 1 hr. after initial set	2150 psi	14.8 MPa
@ 3 hrs. after mixing	3000 psi	20.7 MPa
@ 6 hrs.	3450 psi	23.8 MPa
@ 24 hrs.	5000 psi	34.5 MPa
@ 28 days	7500 psi	51.7 MPa
Scaling Resistance in Presence of De-Icing Salt, ASTM C672 after 50 Cycles of Freezing and Thawing		
No Scaling (Rating O)		

**NOTE:** Compressive strength determined on 2 in. (50 mm) cube specimens, moist cured at 73° ± 3°F (23° ± 2°C) after 24 hours.

### Application Procedures

1. Remove loose or unsound concrete by chipping, saw cutting, or other mechanical means. It is preferable to have a minimum repair thickness of 1/2 in. (12 mm) with square cut edges. Feather edging is not recommended.
2. Remove dust and foreign material from the repair area.
3. Saturate the repair area with water. Just as the concrete surface becomes dry, place the Restora-Top 100 material.



4. Add approximately 3/4 of the required water to the mixing container (0.39 U.S. gallons/1.5 litres of water is usually sufficient at this stage for each 55 lb./25 kg bag of product). While mixing, gradually add the Restora-Top 100 powder to the water. Add more water as required to obtain the desired consistency. Do not exceed 0.86 U.S. gallons (3.3 litres) of water per 55 lb. (25 kg) bag of Restora-Top 100.

5. Mix until thoroughly blended and until required consistency has been obtained. Normally a 2 minute mixing time is adequate. If the Restora-Top begins to harden or set, discard the mix. Do not add more water to the mixing container.

6. Place the mixed material as rapidly as possible and work the mix well into the prepared concrete surface to ensure freedom from voids and to obtain proper bonding.

7. Complete finishing operations as quickly as possible and be sure to clean the mixing container between batches. Partially set material in the mixer can accelerate the setting of subsequent batches.

## Curing

1. After final set, moist curing of Restora-Top 100 for 24 hours is recommended.

2. In hot, dry or windy weather conditions, apply curing compound to the repaired area as soon as the Restora-Top material has set.

3. Protect from freezing for the first 24 hours, and protect from temperatures below 27°F (-3°C) for 72 hours.

## Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

## Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

## Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.



### Concrete Restoration

**03900**

Patching &  
Resurfacing

### Description

XYPEX RESTORA-TOP 200 is one of three Xypex products specifically formulated for the repair and rehabilitation of horizontal concrete surfaces. Xypex Restora-Top 200 is recommended for patching requirements that exceed 1 in. (25 mm) thickness and where high impact resistance is required. Restora-Top 200 consists of specially modified Portland cement, fine aggregate gradations, 1.2 in. (30 mm) long steel fibers, and admixtures combined in controlled proportions. This compound provides excellent adhesion properties, rapid setting and strength gain as well as superior durability and reduced shrinkage.

### Recommended for:

- Concrete Floors
- Parking Decks
- Walkways
- Warehouse Floors
- Bridge Decks
- Roads

### Advantages

- Excellent adhesion to existing concrete surfaces
- Traffic-ready in two to four hours
- Increased toughness and impact resistance
- Easy to use – just add water and mix
- Rapid set and strength gain
- Suitable for indoor and outdoor use
- VOC compliant

### Limitations

Restora-Top 200 should not be mixed and placed at temperatures below 37°F (3°C) or above 86°F (30°C). Protection from direct sunlight is desirable under hot or windy conditions. Use only as a patching or filling material.

### Packaging

Xypex Restora-Top 200 is available in 55 lb. (25 kg) bags.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C).

### Coverage

At 1 in. (25 mm) thickness, each 55 lb. (25 kg) bag of Restora-Top 200 will cover approximately 5.7 sq. ft. (0.52 m<sup>2</sup>).

### Physical Properties

Setting Time, ASTM C 403		
Initial, at 68°F (20°C)	25 minutes	
Final, at 68°F (20°C)	45 minutes	
Working Time at 68°F (20°C)		
	20 minutes	
Air Content (% of Volume)		
	5%	
Compressive Strength		
@ 1 hr. after initial set	2150 psi	14.8 MPa
@ 3 hrs. after mixing	3000 psi	20.7 MPa
@ 6 hrs.	3450 psi	23.8 MPa
@ 24 hrs.	5000 psi	34.5 MPa
@ 28 days	7500 psi	51.7 MPa
Scaling Resistance in Presence of De-Icing Salt, ASTM C672 after 50 Cycles of Freezing and Thawing		
No Scaling (Rating 0)		

**NOTE:** Compressive strength determined on 4 in. (100 mm) cube specimens, moist cured at 73° ± 3°F (23° ± 2°C) after 24 hours.

### Application Procedures

1. Remove loose or unsound concrete by chipping, saw cutting, or other mechanical means. It is preferable to have a minimum repair thickness of 1/2 in. (12 mm) with square cut edges. Feather edging is not recommended.
2. Remove dust and foreign material from the repair area.

3. Saturate the repair area with water. Just as the concrete surface becomes dry, place the Restora-Top 200 material.

4. Add approximately 3/4 of the required water to the mixing container (0.39 U.S. gallons/1.5 litres of water is usually sufficient at this stage for each 55 lb./25 kg bag of product). While mixing, gradually add the Restora-Top 200 powder to the water. Add more water as required to obtain the desired consistency. Do not exceed 0.8 U.S. gallons (3 litres) of water per 55 lb. (25 kg) bag of Restora-Top 200.

5. Mix until thoroughly blended and until required consistency has been obtained. Normally a 2 minute mixing time is adequate. If the Restora-Top begins to harden or set, discard the mix. Do not add more water to the mixing container.

6. Place the mixed material as rapidly as possible and work the mix well into the prepared concrete surface to ensure freedom from voids and to obtain proper bonding.

7. Complete finishing operations as quickly as possible and be sure to clean the mixing container between batches. Partially set material in the mixer can accelerate the setting of subsequent batches.

## Curing

1. After final set, moist curing of Restora-Top 200 for 24 hours is recommended.

2. In hot, dry or windy weather conditions, apply curing compound to the repaired area as soon as the Restora-Top material has set.

3. Protect from freezing for the first 24 hours, and protect from temperatures below 27°F (-3°C) for 72 hours.

## Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

## Safe Handling Information

Xypex is alkaline. As a cementitious powder or mixture, Xypex may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

## Warranty

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## Concrete Waterproofing

**07100**

Flexible  
Cementitious  
Membrane

### Description

Xypex FCM 80 is specifically designed for repairing cracks subject to movement, sealing construction joints, restoring deteriorated concrete, and waterproofing concrete structures. FCM 80 has exceptional adhesive and elongation characteristics and is often used in conjunction with the Xypex Crystalline Concrete Waterproofing and Protection System. FCM is a two component product consisting of specialized liquid polymer dispersion and a cementitious powder. These components are mixed just prior to application.

### Recommended for:

- Moving Cracks
- Construction Joints
- Deteriorated Concrete Surfaces
- Concrete Block Walls
- Balconies, Terraces, and Planters
- Water-holding Structures
- Sewage and Water Treatment Tanks
- Marine Structures
- Thermal Contraction and Expansion

### Advantages

- Flexible
- Superior elongation properties
- Excellent adhesive qualities
- Impermeable to water and chlorides
- Breathable, seamless
- Durable, retains properties in climatic extremes
- Non-toxic, solvent-free, odorless
- Effective when subjected to thermal contraction and expansion

### Packaging

The Xypex FCM 80 is packaged in a carton as a unit (kit), which includes the liquid component (1.06

U.S. gallon/4 litre bottle) and the powder component (22 lb./10 kg pail). For larger projects, customized packaging is available; contact the manufacturer for details.

### Coverage

When mixed, one unit will cover an estimated 28 sq. ft. (2.6 m<sup>2</sup>) at a two-coat application thickness of 1/8 in. (3 mm).

### Storage

FCM materials must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is six months when stored under proper conditions.

### Properties

Solids Content (liquid component – EN ISO 3251)	
Solids Content (%)	54
Viscosity (liquid component – EN ISO 3219)	
Dynamic Viscosity (MPa•s)	50 - 155
Glass Transition Temperature (liquid component)	
Tg	-49°C
Liquid Water Permeability (EN 1062-1 Table 5)	
Water Transmissibility	Class W <sub>3</sub> – Low ( <0.1 kg / (m <sup>2</sup> •hr <sup>0.5</sup> )
Tensile Properties (ASTM D 412) – 28 day old; lab cured	
Elongation @ break (%)	60 - 100%
Tensile Strength (MPa/psi)	1.0 / 145
Bond Strength (EN 1542) – 28 day old; lab cured	
Bond Strength (MPa/psi)	0.80 / 116
Cold Bend Test (in house procedure)	
Resistance to cracking (using 9.5 mm mandrel @ -16°C)	pass (no crack)

### Application Procedures

#### SURFACE PREPARATION

Concrete surfaces must be free of all bond inhibiting materials such as loose concrete, dirt, dust, oil, grease, release agents, curing and cleaning compounds. Clean the surface thoroughly by sand-blasting, waterblasting or etching with muriatic (HCL)

acid. Prior to the FCM application, the preferred substrate moisture condition is dry, but may be "saturated surface dry".

### MIXING

Mix by weight: 1 part FCM 80 liquid with 2.5 parts FCM powder. Mix thoroughly for 3 - 4 minutes to obtain a homogeneous and lump-free compound. Do not mix more material than can be used in 30 minutes.

### REPAIR OF HAIRLINE CRACKS AND FAULTY CONSTRUCTION JOINTS – NEGATIVE SIDE APPLICATION

#### No Water Flow

1. Clean and prepare the concrete surface as specified above.
2. Sawcut a 1 in. (25 mm) groove along crack length to a depth of approximately 1.5 in. (40 mm). Avoid contact with reinforcing steel.
3. Pressure wash cracks to remove loose material.
4. Mix 3 parts Xypex Concentrate and 1 part Patch'n Plug with 1 part water by volume to a stiff mortar consistency and pack tightly into groove. Air cure minimum of 40 minutes.
5. Trowel-apply first coat of FCM 80 to a width of 4 - 6 in. (10 - 15 cm) and a thickness of 1/16 in. (1.5 mm). Allow first coat to dry for six hours, then apply second coat of FCM 80 at the same rate to a total membrane thickness of 1/8 in. (3 mm). The second coat should be applied at right angles to the first coat.

#### Against a Flow of Water

1. Follow the same preparation procedures as above (i.e. cleaning, saw cutting, power washing).
2. Mix 3 parts Xypex Patch'n Plug and 1 part Concentrate with 1 part water by volume (note: this is the reverse of the ratio above) to a stiff mortar consistency and pack tightly into groove. Air cure minimum 40 minutes.
2. Trowel-apply first coat of FCM 80 to a width of 4 - 6 in. (10 - 15 cm) and a thickness of 1/16 in. (1.5 mm). Allow first coat to dry for six hours, then apply second coat of FCM 80 at the same rate to a total mem-

brane thickness of 1/8 in. (3 mm). The second coat should be applied at right angles to the first coat.

### COATING APPLICATION – POSITIVE SIDE

1. Clean and prepare the concrete substrate as specified above.
2. Apply an initial coat of the FCM 80 mixture by trowel or spray to a thickness of approximately 1/16 in. (1.5 mm). Allow coating to dry for minimum of six hours and maximum of 24 hours.
3. Apply second coat at right angles to first coat to ensure even coverage. Second coat should bring total membrane thickness to 1/8 in. (3 mm).

#### NOTE:

- i. For optimum performance, the FCM coating should be applied to the positive side of a concrete surface subjected to hydrostatic pressure.
- ii. The ambient temperature for applying FCM should be between 50°F (10°C) and 86°F (30°C).
- iii. FCM can be applied directly over cracks up to 1/16 in. (1.5 mm) width and the FCM will withstand crack movement up to 1/16 in. (1.5 mm).
- iv. If significant crack movement is anticipated, a "bond-breaker" is recommended. Simply place 3/4 in. (19.1 mm) wide Scotch Linerless Rubber Splicing Tape 130C over the top of the crack or joint prior to applying the FCM membrane. This will allow for further elongation of the FCM material.
- v. Overall waterproofing system details such as penetrations, perimeters, upturns, drainage, protection systems, etc. are the responsibility of the designer and / or users.

### Curing

Xypex FCM 80 does not require any special curing procedures other than maintaining coating above 50°F (10°C) for a period of 24 hours after application. The FCM dries within 5 to 6 hours of application at 68°F (20°C). Protect the membrane surface from rain or water until dry. Air cure minimum 14 days prior to immersing the membrane in water.



## Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of FCM 80 with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative. In view of the many factors that may affect the application of FCM 80, the information contained in this data sheet does not relieve the applicator or user from carrying out their own investigations or tests.

## Safe Handling Information

In liquid, powder or mixed form, FCM 80 may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. Contact the Manufacturer or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

## Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.



## Concrete Waterproofing

**07160**

## Cementitious Crystalline – Curing

### Description

XYPEX GAMMA CURE is a curing agent designed specifically for Xypex crystalline waterproofing products. Gamma Cure may be used as an alternative to water curing for certain Xypex applications. It is also used to accelerate the Xypex crystallization process. Xypex Gamma Cure acts as an evaporation retardant by retaining the maximum amount of moisture in the Xypex coating. It also provides a catalyst for the reaction with the Xypex crystalline waterproofing treatment. It is a self-dissipating (2 - 3 days) non-film forming product.

### Recommended for:

- Applications where water-curing is not possible
- Hot, dry, windy conditions
- Vertical surfaces

### Packaging

Xypex Gamma Cure is available in 1 U.S. gallon (3.79 litre) bottles and 5 U.S. gallon (18.95 litre) pails.

### Storage

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

### Coverage

One U.S. gallon (3.79 litres) of Gamma Cure when diluted with water will cover approximately 800 sq. ft. (75 m<sup>2</sup>).

### Application Procedures

**1. CURING OF XYPEX COATING** Dilute one part Gamma Cure with 3 parts clean water. Apply by spraying onto the crystalline waterproofing coating after the coating has reached an initial set, but before it dries (approx. 1 - 2 hours).

**2. PREPARATION OF CONCRETE SUBSTRATE IN HOT, DRY OR WINDY CONDITIONS** Dilute one part Gamma Cure with 3 parts clean water and apply to concrete surface before application of the Xypex crystalline coating. Gamma Cure should be applied while the concrete is still damp from pre-watering.

### Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

### Safe Handling Information

Gamma Cure is an acidic solution. This product may be a mild to moderate skin and eye irritant. In addition, many of the components of the cementitious products that are used in conjunction with the Gamma Cure may also possess significant skin and eye irritation potential. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

### Warranty

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.



## Concrete Restoration

**03900**

Patching & Resurfacing

### Description

XYCRYLIC ADMIX is a water-based, high solids, polymer dispersion specifically designed for fortifying Portland cement compositions. This liquid is milky-white in color and improves curing qualities, enhances bond, imparts excellent water and weather resistance, and reduces shrinkage cracking. Xycrylic Admix is also used to fortify Xypex Patch'n Plug.

### Recommended for:

- Patching and Concrete Repairs
- Resurfacing Floor Underlayments
- Terrazzo Flooring
- Spray and Fill Coats
- Highway and Bridge Deck Repair

### Advantages

- Hardens and toughens cement mortars for improved durability
- Enhances adhesion capabilities to a wide variety of surfaces
- Increases resistance to many industrial chemicals
- Eliminates water curing

### Durability and Strength

Cement mortars modified with Xycrylic Admix are hard, tough and durable. Compared with unmodified mortars, Xycrylic modified mortars have far superior flexural, adhesive and impact strengths as well as excellent abrasion resistance. They are especially useful where thin sections are desirable and where excessive vibration and heavy traffic is encountered.

### Adhesion

Xycrylic Admix modified mortars have excellent adhesion to a variety of surfaces such as concrete, masonry, brick, wood, metals and others.

### Resistance Properties

Cement mortars modified with Xycrylic Admix are resistant to many industrial chemicals as well as ultraviolet light and heat. Mortars containing Xycrylic Admix dry to a uniform color.

### Packaging

Xycrylic Admix is available in 1 U.S. gallon (3.79 litre) bottles and 5 U.S. gallon (18.95 litre) pails.

### Storage

Keep Xycrylic Admix from freezing.

### Mixing

Xycrylic Admix may be used full strength or diluted with clean water depending on application requirements.

### Test Data

Physical Strength of Cement Mortars					
ASTM Standard Test Method	Mixing Liquid				
	Full Strength	1:1 Water	1:2 Water	No Xycrylic	
C-190-85 Tensile Strength	610 4.2	440 3.0	375 2.6	235 1.6	psi MPa
C-109-88 Compressive Strength	5700 39.3	4530 31.2	3830 26.4	2390 16.5	psi MPa
C-348-86 Flexural Strength	1570 10.8	1130 7.8	960 6.6	610 4.2	psi MPa
Shear Bond Adhesion	640 4.4	360 2.5	260 1.8	45 0.31	psi MPa

**NOTE 1:** Strength properties are based on cement mortar prepared as 3 parts sand to 1 part cement by volume.

**NOTE 2:** Strengths are based on a 28 day air-cure. Wet cure strengths may be less.

### Application Procedures

Xycrylic Admix may be used full strength or diluted with clean water depending on application requirements.

### For Use With Cement Mortar

1. Thoroughly premix sand and cement (1 part cement to 2 parts sand).

2. Blend Xycrylic Admix with water according to strength, bonding and resistance requirements.
3. Add the Xycrylic mixing liquid (whether full strength or diluted with water) to the sand and cement.
4. Mix thoroughly until desired workable consistency is reached. Always withhold some Xycrylic mixing liquid so that the mortar will not be too fluid and so that mixing liquid can be carefully gauged near end of mixing cycle (2 - 4 minutes).

#### **For Use With Patch'n Plug**

1. Blend Xycrylic Admix with clean water (1 part Xycrylic to 1 part water by volume).
2. Add Xycrylic mixing liquid to the Patch'n Plug powder at a rate of 1 part liquid to 3.5 parts Patch'n Plug.
3. Mix to a stiff putty consistency. Do not mix more than can be used in three minutes.

### **Curing**

For optimum physical properties, cement mortars modified with Xycrylic Admix should be air-cured at ambient temperature and relative humidity.

### **Technical Services**

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

### **Safe Handling Information**

Xycrylic Admix is alkaline and has a slight ammoniacal odor. This product may be a mild to moderate skin and eye irritant. In addition, many of the components of the cementitious products that are used in conjunction with the Xycrylic Admix may also possess significant skin and eye irritation potential. Directions for treating these problems are clearly detailed on all Xypex pails and packaging.

The Manufacturer also maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

### **Warranty**

The Manufacturer warrants that the products manufactured by it shall be free from material defects and will be consistent with its normal high quality. Should any of the products be proven defective, the liability to the Manufacturer shall be limited to replacement of the product ex factory. The Manufacturer makes no warranty as to merchantability or fitness for a particular purpose and this warranty is in lieu of all other warranties expressed or implied. The user shall determine the suitability of the product for his intended use and assume all risks and liability in connection therewith.



**Concrete Waterproofing**  
**03010**  
Surface Hardener,  
Sealer & Dustproof

**Description**

Xypex Quickset is a water-soluble liquid blend of silicates, neutralizers and penetrating agents specially compounded to harden, dustproof and seal the surfaces of fresh or newly cured concrete floors. Applied to the concrete surface, Xypex Quickset penetrates into the capillaries of the concrete substrate and chemically reacts with the free lime and calcium carbonate to form a hard, insoluble gel within the pores, thus closing off the small voids. Quickset provides superior hardening and a dustproof finish.

**Recommended for:**

- Concrete slabs where a hard, abrasion resistant (light to moderate traffic load), dustproof surface is required.
- Enhancing the abrasion resistance of a concrete surface where Concentrate DS-1 or DS-2 has been applied.

**Packaging**

Xypex Quickset is available in 1 U.S. gallon (3.79 litre) bottles and 5 U.S. gallon (18.95 litre) pails.

**Storage**

Xypex products must be stored dry at a minimum temperature of 45°F (7°C). Shelf life is one year when stored under proper conditions.

**Coverage**

Coverage rates will vary depending on surface conditions of the concrete, porosity, and project requirements. The following rates are approximate, assuming average concrete, finish, temperature and other factors:

<b>Rough or Broom Finish</b>	100 - 120 ft. <sup>2</sup> /U.S. gallon (2.5 - 3.0 m <sup>2</sup> /litre)
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<b>Moderately Trowelled Floor</b>	120 - 150 ft. <sup>2</sup> /U.S. gallon (3.0 - 3.8 m <sup>2</sup> /litre)
<b>Heavily Trowelled Floor</b>	150 - 200 ft. <sup>2</sup> /U.S. gallon (3.8 - 5.0 m <sup>2</sup> /litre)

For the best results, increase coverage rate for each succeeding coat.

**Application**

1. Surface to be treated should be clean and free of all loose dirt, oil, curing compounds, efflorescence, free standing water and other foreign material. New concrete should have cured at least one month before treatment.

2. Dilute Quickset at a rate of one part liquid Quickset solution to one part clean water by volume. Mix thoroughly.

3. Apply Xypex Quickset by brush, soft-bristle broom, squeegee or spray. When applying by squeegee, the Quickset should be spread evenly over the surface to eliminate all puddles, or excess liquid. Brush out or mop up any puddles immediately.

4. If Xypex Quickset is to be spray applied, a garden-type sprayer can be used and the liquid should be applied in an even and uniform manner so that there are no puddles. It is recommended that the application be done in two even coats and each coat must be allowed to dry thoroughly before proceeding with next coat. Any surplus Quickset liquid should be immediately mopped up or brushed out.

**NOTE:**

1. Xypex Quickset should not be applied in temperatures less than 45°F (7°C) and must be kept from freezing before use.

2. Protect glass, stainless steel, aluminum, painted and ceramic surfaces from Xypex Quickset. If this should occur immediately wipe off with cloth soaked in water and wipe dry.

**Drying Time**

Xypex Quickset dries in approximately one-half to one hour per coat depending on temperature, humidity,



project conditions, etc. Each coat should be allowed to dry thoroughly before applying additional coats. Xypex Quickset should be completely dry before any traffic is permitted. It is recommended that 24 hours elapse before permitting any traffic on the treated area.

### Technical Services

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the Technical Services Department of Xypex Chemical Corporation or your local Xypex representative.

### Safe Handling Information

Xypex Quickset is a highly alkaline solution. This product may be a mild to moderate skin and eye irritant. In addition, many of the components of the cementitious products that are used in conjunction with the Xypex Quickset may also possess significant skin and eye irritation potential. Directions for treating these problems are clearly detailed on all Xypex pails and packaging. The Manufacturer maintains comprehensive and up-to-date Material Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of workers and customers. The Manufacturer recommends that you contact Xypex Chemical Corporation or your local Xypex representative to obtain copies of Material Safety Data Sheets prior to product storage or use.

### Warranty

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### What makes Xypex unique?

Xypex becomes an integral part of the concrete mass itself. Traditional barrier products, on the other hand, rely solely on their performance at the surface of the concrete and are therefore subject to deterioration caused by exposure to the environment, hydrostatic pressure, puncturing, delamination, chemical erosion, and damage during backfilling. Xypex was developed to eliminate these very issues. The Xypex formula is based on the natural characteristics of concrete – the fact that concrete is both porous and chemical in nature. With moisture as the catalyst, Xypex's proprietary chemicals react with the products of cement hydration to form a non-soluble complex within the pores, voids and capillary tracts of the concrete mass. From this inside position, Xypex renders the concrete impenetrable by water and other liquids from any direction, eliminates the problems normally associated with traditional barriers and, in the process, enhances the quality and durability of the concrete structure.

### How long does Xypex last?

The Xypex treatment, unlike most other systems, becomes a permanent part of the concrete matrix. Its unique dendritic crystalline growth will not deteriorate under normal conditions, and the crystalline process will reactivate whenever water is present.

### What are some typical Xypex applications?

Typical Xypex applications include reservoirs, sewage and water treatment tanks, secondary containment structures, tunnels, underground vaults, manholes, concrete pipe, foundations, pools, parking structures and below grade construction.

### Can Xypex be used against extreme hydrostatic pressure?

Yes. Because Xypex is not dependent upon adhesion to the concrete surface and, instead, becomes an integral part of the concrete mass, it is capable of resisting extreme hydrostatic pressure from either side (positive or negative) of the concrete. Independent laboratory testing in accordance with U.S. Army Corps of Engineers CRD C-48-73 "Permeability of Concrete" showed that Xypex-treated concrete withstood up to 405 feet (123.4 m) of head pressure (175 psi/1.2 MPa), the limit of the testing apparatus.

### Does Xypex protect reinforcing steel?

Yes. By preventing the intrusion of water, salt water, sewage, and most chemicals, Xypex helps protect reinforcing steel against oxidation and deterioration.

### Does Xypex protect concrete against freeze/thaw damage?

Yes. By blocking the intrusion of water into concrete, Xypex helps protect the concrete from the damaging effect of repeated freeze/thaw cycles.

### Does Xypex have any adverse effect on concrete?

No. The Xypex crystalline formation becomes a part of the concrete matrix itself and has no deleterious effect on the concrete. In fact, independent laboratory testing has shown that under most conditions Xypex enhances the strength and durability of the concrete structure.

### Is Xypex toxic?

No. Xypex contains no volatile organic carriers (VOC) and can be applied safely in enclosed surroundings. Xypex is approved by numerous health and water authorities around the world for use on structures that contain potable water or foodstuffs. A few of these agencies are:

- NSF International
- Swiss Federal Department of Health
- Japan Food Research Laboratories
- United Kingdom (DWI) Drinking Water Inspectorate
- Australian Water Quality Centre
- Singapore Institute of Standards and Industrial Research
- France Research Centre for the Control of Water
- Czech Republic Health Institute & Centre for Drinking Water

### In what forms is the Xypex Crystalline Technology available?

The Xypex Crystalline Technology is available in three forms:

- As a Coating System (Xypex Concentrate & Modified) for new or existing structures
- As a Concrete Additive (Xypex Admix C-Series) to be added at time of concrete batching
- As a Dry Shake Material (Xypex Concentrate DS-1 & DS-2) for fresh horizontal surfaces

These three options will prove an asset to the value-engineering process and to the flexibility of the construction schedule.

### How is Xypex different from other products?

The Xypex crystalline system for concrete waterproofing and protection is substantially different from traditional barrier products (membranes, cementitious coatings, etc):

1. Xypex creates a crystalline structure deep within the pores and capillary tracts of the concrete mass to prevent the penetration of water and aggressive chemicals. In contrast, barrier type products function only at the surface of concrete.
2. Because Xypex is not dependent on surface adhesion to achieve its waterproofing effect, it is resistant to extreme hydrostatic pressure.
3. Xypex will seal hairline cracks up to 0.4 mm (1/64").
4. Xypex is not subject to the deterioration problems encountered by membranes.
5. Xypex is designed to be permanent and reactivates whenever water is present.

### Is Xypex used to waterproof cracks, faulty joints and other defects in concrete?

Yes. Xypex has a specific repair system that utilizes its unique crystalline waterproofing technology to stop water flow through cracks, faulty construction joints and other defects. In the case of expansion joints or chronic moving cracks, a flexible sealant is recommended.

### ***When Applied as a Coating:***

#### **Can the Xypex coating be applied to the negative side of a structure?**

Yes. Although applied as a coating, Xypex is not relying on its surface bonding capability to achieve its waterproofing effect. By means of diffusion, the reactive chemicals in the Xypex coating migrate through the capillary tracts within the concrete to become an integral part of the concrete mass. Therefore, the Xypex coating can be applied to either the positive (water side) or negative side even against strong hydrostatic pressure.

#### **Is there a preference when choosing between the positive or negative side?**

Generally, it is recommended that the Xypex coating be applied to the positive side (water side), if accessible, so as to ensure maximum benefit. Therefore, new construction specifications almost always call for the use of the Xypex coating on the positive side (water side). If, however, the positive side is not accessible e.g. tunneling projects or rehabilitation of existing structures, the Xypex coating will be specified for use on the negative side against the hydrostatic pressure.

#### **Can the Xypex coating be applied while the concrete is wet?**

Yes. In fact, the concrete must be wet or moist before applying the Xypex slurry coat. Xypex requires moisture to generate the crystalline growth in concrete. The presence of moisture is also necessary to ensure proper bonding of the slurry coat to the concrete substrate.

#### **Is the Xypex coating suitable for use on surfaces other than concrete?**

Xypex is totally compatible with the chemistry of concrete, whether poured-in-place, precast or shotcrete. It is not suitable for application to cut-limestone, clay brick, wood, metals, asphalt or other non-concrete building materials.

#### **How deep does the Xypex crystalline formation penetrate the concrete?**

The Xypex chemical reactions that initially take place at the concrete surface will continue deep into the concrete structure. Various factors affect the rate and depth of crystallization within the concrete. Some of these factors are: number of Xypex coats, mix design of the concrete, density, porosity, cement content, exposure to moisture and temperature. Independent testing measured the depth of Xypex crystalline penetration into a cast-in-place concrete block at 30 cm (approximately 12 inches). The test concrete sample was coated on the top surface with Xypex Concentrate and left outside the research laboratory in ambient temperatures for 12 months.

#### **How resistant is the Xypex coating to aggressive chemicals?**

Based on independent testing according to ASTM C 267-77 "Chemical Resistance of Mortars", the Xypex coating is not affected by a wide range of aggressive chemicals including mild acids, solvents, chlorides and caustic materials. Because Xypex is pH specific (not chemical specific) it will protect concrete from any chemical whose pH range is 3.0 to 11.0 constant contact, or 2.0 to 12.0 periodic contact.

### Is the Xypex coating affected by temperature, humidity, ultraviolet and oxygen levels?

When applied according to specifications, Xypex performs at 100% efficiency within -25°F to +265°F (-32°C to +130°C) constant temperatures or within -301°F to +2786°F (-185°C to +1530°C) periodic temperatures. Humidity, ultraviolet and the oxygen level (oxidation) have no effect on a Xypex coating.

### What is the appearance of a Xypex coating?

A Xypex coating normally produces a grey-colored, cementitious surface. However, Xypex "White" is also available.

### Can paint and other finishing materials be applied over a Xypex coating?

Yes. In most circumstances paint, epoxy coatings, cement parge coats, plaster and stucco can be applied over a Xypex coating. For further information concerning the interface of the Xypex coating with paint and other finishing materials, refer to pages 2.5-5 and 3.1-10 of this binder, and consult with a Xypex technical representative.

### How is the Xypex coating system different from other cementitious coatings?

Most cementitious coatings are simply surface treatments and are totally dependent on maintaining a proper bond to the concrete surface. Such coatings usually incorporate a latex modifier which makes the coating less permeable and acts as a bonding agent for better adhesion to the surface. They are surface treatments only, and have the added disadvantage of limiting breathability of the concrete. They do not form crystals within the concrete substrate (contrary to what is sometimes represented) and are not effective when applied against hydrostatic pressure.

### What are the installation advantages to using a Xypex coating system instead of membranes?

The crystalline nature of the Xypex waterproofing system provides many installation advantages over traditional barrier products:

1. Xypex does not require a dry surface; in fact, a wet surface is necessary.
2. Xypex does not require dry weather to be applied.
3. Xypex does not require costly surface priming or leveling prior to application.
4. Xypex cannot puncture, tear or come apart at the seams.
5. Xypex does not require protection during backfilling or during placement of steel, wire mesh or other materials.
6. Xypex can be applied on either side of a concrete surface – the negative or the positive side.
7. Xypex does not require sealing, lapping and finishing of seams at corners, edges or between membranes.
8. Xypex is less costly to apply than most other methods.



### ***When Applied as a Concrete Additive:***

#### **What is the difference between the various additives in Xypex's Admix C-Series?**

The Admix C-Series has been specially formulated to meet varying project and temperature conditions. Xypex Admix C-500 is specifically formulated to meet modern concrete practices that incorporate additives such as fly ash and slag. For most concrete mix designs adding the Admix C-500 will have minimal or no effect on setting time. Xypex Admix C-1000 is designed for typical Portland cement-rich concrete, where normal to a mildly extended set time is desired. Xypex Admix C-2000 is designed for projects where extended set time is required due to high ambient temperatures or long ready-mix delivery times.

#### **When is Xypex Admix introduced into the concrete mix?**

Xypex Admix is added to the concrete mix at time of batching. The sequence of procedures for addition of the Admix powder will vary depending on the type of batch plant operation and equipment e.g. ready-mix plant (dry batch operation), ready-mix plant (central mix operation), or precast batch plant.

#### **What is the recommended dosage rate for Xypex Admix?**

Xypex Admix is added to the concrete mix at a dosage rate within the range of 2 - 3% by weight of the Portland cement content. Where the "No Fines" (NF) grade is utilized, the equivalent dosage rate is 1 - 1.5%. For assistance in determining the appropriate dosage rate for a particular project, consult Xypex technical literature or contact a Xypex technical representative.

#### **Is Xypex Admix available in soluble bags?**

Yes. In North America, Australia, S.E. Asia, Europe, the Middle East and Africa, Xypex Admix is now available in soluble bags. The soluble bags provide a convenient, easy, dust-free method of installing the Admix to concrete mixes, and they are available in several sizes so as to accommodate the various dosage rates and mix design requirements.

#### **Can Xypex Admix be used in concrete containing other additives such as a water-reducer, plasticizer or air-entrainment agent?**

Yes. Xypex Admix has been used successfully in concrete mix designs containing a variety of other admixtures. However, it should be noted that the use of retarding admixtures at recommended dosage rates may cause further extension of set time when used with Xypex Admix. Consult with a Xypex technical representative for assistance in determining which version of Xypex Admix to use and the appropriate dosage rate.

#### **Can Xypex Admix be used in concrete containing fly ash, micro-silica or slag cement?**

Yes. Xypex Admix is very effective when used in modern mix designs that incorporate cementitious replacement materials i.e. fly ash, silica fume and blast furnace slag. The reactions that take place to form the crystalline structure are very complex. During the cement hydration process, Xypex's active chemicals not only react with calcium hydroxide and unhydrated cement particles but also with various metal oxides and mineral salts, regardless of the cement type used. Consult with a Xypex representative to determine dosage rates for such blended cement mix designs.

### How are the setting time and compressive strength of concrete affected by the addition of Xypex Admix?

The setting time of concrete is affected by the chemical and physical composition of ingredients, temperature of the concrete and climatic conditions. Extension of set time may occur when using Xypex Admix. The amount of extended set will depend upon the concrete mix design and the dosage rate of the Admix. Concrete containing Xypex Admix may develop higher ultimate strengths than plain concrete. Trial mixes should be carried out under project conditions to determine setting time and strength of the concrete.

### Are there any limitations that affect the performance of Xypex Admix?

Use of Xypex Admix requires a minimum of 10% Portland cement content. Of course, optimum effectiveness will be dependent on a number of factors such as thickness of the concrete, Portland cement content, whether there is sufficient reinforcing steel for strength and crack control, quality of placing and finishing practices, sealing of construction joints etc. Typically, Xypex requires a minimum concrete thickness of 5 cm (2") and a minimum design strength of 20 MPa (3000 psi).

### ***When Applied as a Dry Shake:***

#### **When are Xypex dry shake products (Xypex Concentrate DS-1 or DS-2) normally used?**

The Xypex “dry shake” products are designed specifically for use on horizontal concrete slabs during the new construction phase. By incorporating the dry Xypex powder into the top surface of freshly poured concrete, the active chemicals in Xypex use the bleed water and moisture in the concrete as a migrating medium to generate the crystalline formation throughout the concrete substrate.

#### **What is the advantage of using the dry shake method?**

Because Xypex “dry shake” products become an integral part of the concrete surface, problems often associated with coatings (e.g. scaling, dusting, flaking, delamination) are eliminated. This can be very beneficial for slabs that require a hard surface due to traffic and abrasion. The dry shake method may also provide cost savings, especially on large projects, by reducing material and labor costs and by helping to speed up the construction schedule.

#### **How is Xypex DS-2 different from Xypex Concentrate DS-1?**

Xypex DS-2 has been specially designed for dry shake applications on horizontal concrete slabs where greater resistance to abrasion is required. Xypex DS-2 contains the same crystalline waterproofing properties as DS-1, however it also includes a synthetic aggregate hardener which has been crushed and graded to particle sizes suitable for concrete floors.



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**Defective Concrete & Honeycomb**

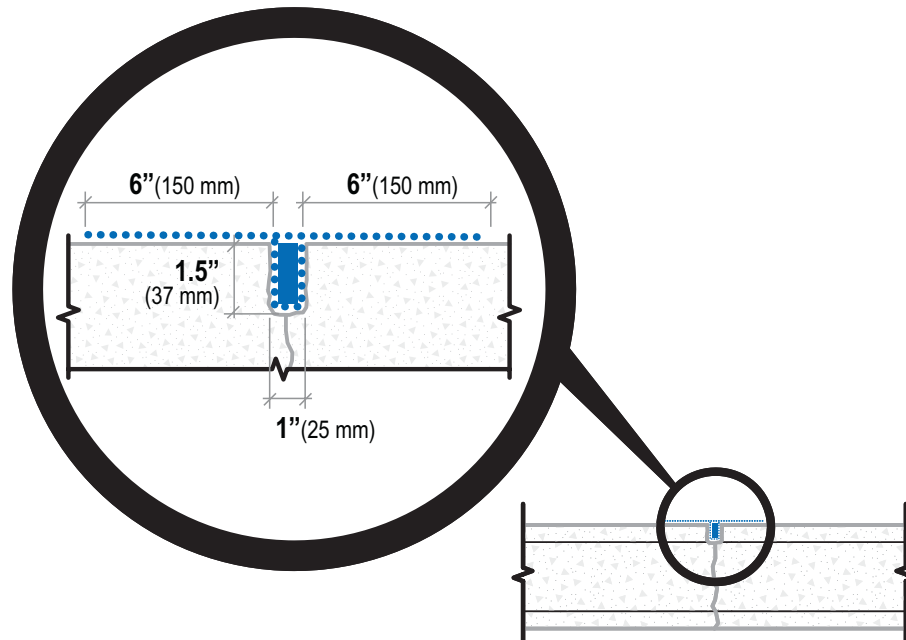
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## REPAIR OF CRACKS & FAULTY CONSTRUCTION JOINTS

**No Water Flow**



- .... CONCENTRATE SLURRY COAT
- CONCENTRATE DRY-PAC

**HYDROSTATIC PRESSURE – NO ACTIVE LEAKING WATER**

### Step 1

Rout out crack/joint in a “U” shaped slot 1” (25 mm) wide and at least 1.5” (37 mm) deep. A “V” shaped slot is not acceptable.

### Step 2

Remove all loose material and saturate with water. Allow water to soak into concrete and then remove all surface water.

### Step 3

Apply one slurry coat of Xypex Concentrate at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) to slot and to 6” (150 mm) strip on either side of slot. Application may be performed by brush or gloved hand.

### Step 4

While slurry coat is still tacky, fill slot to surface with Xypex Concentrate Dry-Pac mixed in the following proportions: one part clean water to six parts Concentrate by volume. Blend Dry-Pac by trowel

for 10 - 15 seconds only (lumps should be present in the mixture). Apply Dry-Pac by gloved hand, then compress it tightly using a pneumatic packing device or a hammer and block.

### Step 5

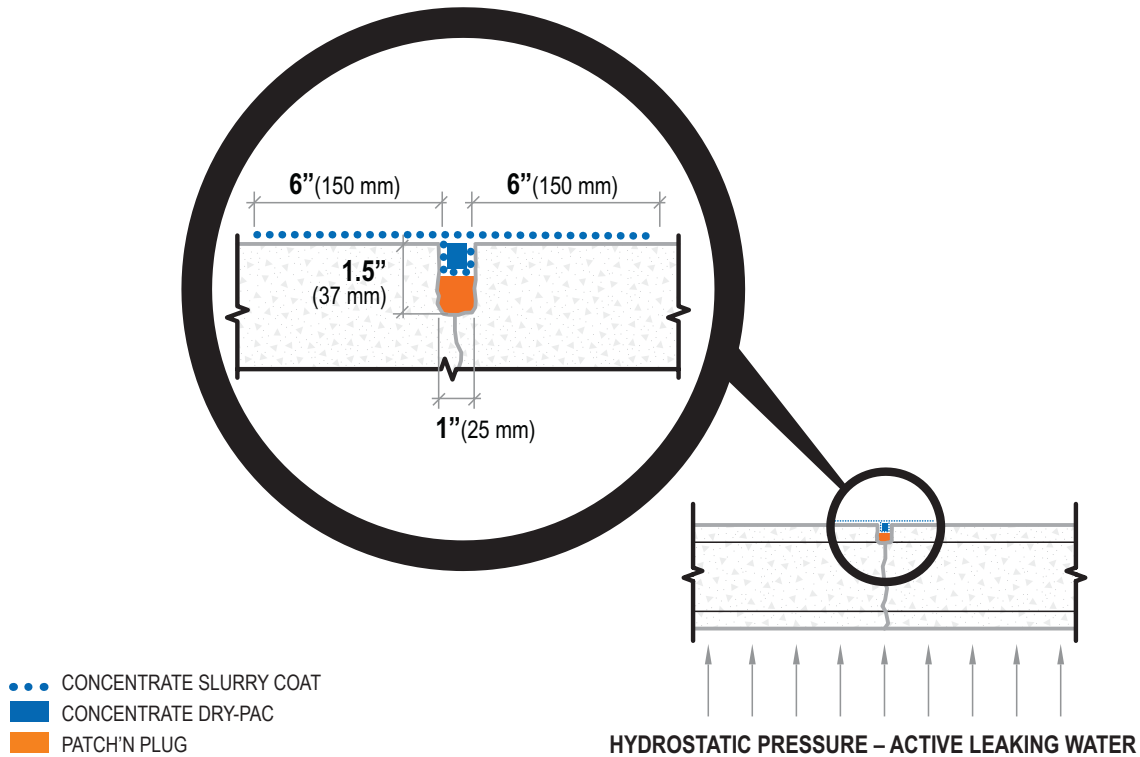
Wet Dry-Pac surface lightly with water, then apply a slurry coat of Xypex Concentrate at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) over the repaired area and to 6” (150 mm) strip on either side of slot.

### Step 6

Cure by fog spraying periodically with water for two days or apply Xypex Gamma Cure immediately after the slurry coat has set.

## REPAIR OF CRACKS & FAULTY CONSTRUCTION JOINTS

**Against a Flow of Water**



### Step 1

Rout out crack/joint in a "U" shaped slot 1" (25 mm) wide and at least 1.5" (37 mm) deep. A "V" shaped joint is not acceptable. Areas with most water flow should be identified and chipped slightly deeper.

### Step 2

Remove all loose material and saturate dry areas with water. Allow water to soak in and then remove all surface water.

### Step 3

To stop active water flow apply Xypex Patch'n Plug to half the depth of slot immediately after removing surface water. Patch'n Plug is mixed by adding one part clean water to 3.5 parts Patch'n Plug powder by volume. Patch'n Plug should be applied to full length of crack/joint area.

### Step 4

Apply a slurry coat of Xypex Concentrate at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) in the slot over the Patch'n Plug and on the 6" (150 mm) strip of

concrete surface on either side of the slot. Application may be performed by brush or gloved hand.

### Step 5

While slurry coat is still tacky, fill slot to surface level with Xypex Concentrate Dry-Pac. Dry-Pac is mixed by adding one part clean water to six parts Xypex Concentrate powder by volume. Blend Dry-Pac by trowel for 10 - 15 seconds only (lumps should be present in mixture). Apply the Dry-Pac by gloved hand, then compress it tightly by using a pneumatic packing tool or a hammer and block.

### Step 6

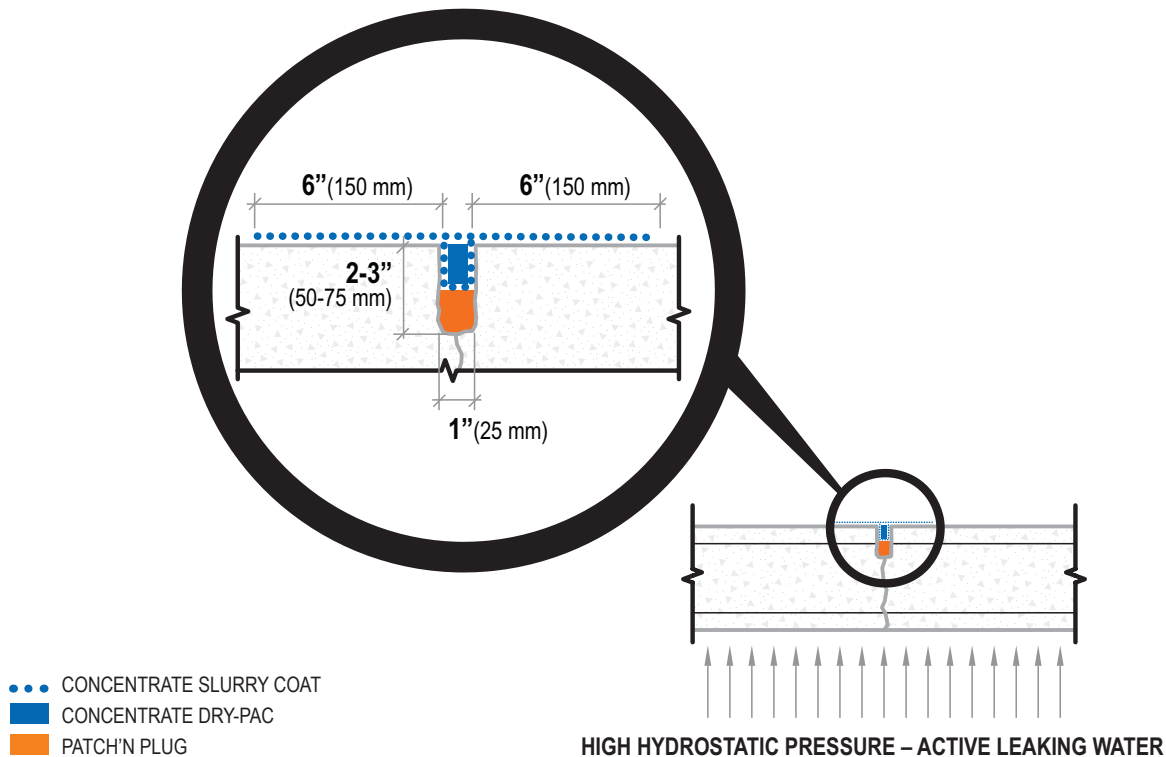
Wet the Dry-Pac surface lightly with water, then apply a slurry coat of Xypex Concentrate at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) over the repaired area and to 6" (150 mm) strip on either side of slot.

### Step 7

Cure by fog spraying periodically with water for two days or apply Xypex Gamma Cure immediately after the slurry coat has set.

## REPAIR OF CRACKS & FAULTY CONSTRUCTION JOINTS

**Against High Pressure Water Flow**



### Step 1

Rout out crack/joint in a "U" shaped slot 1" (25 mm) wide and 2 - 3" (50 - 75 mm) deep. A "V" shaped slot is not acceptable.

### Step 2

In area of greatest water flow, drill hole or cavity 0.5" (13 mm) deeper into slot to accommodate a bleeder hose. A bleeder hose is a minimum 1.5 foot (0.5 m) length of smooth surfaced, fairly rigid tubing. Its purpose is to relieve the water pressure while crack/joint is being repaired.

### Step 3

Remove all loose material and saturate dry areas with water. Allow water to soak in and then remove all surface water.

### Step 4

Place one end of bleeder hose into the hole or cavity and, while holding hose steady, apply Xypex Patch'n Plug to the slot around the hose. Approximately two to four applications of Patch'n Plug may be necessary to secure the hose in place and embed the tubing completely up to surface level.

### Step 5

To stop active water flow apply Xypex Patch'n Plug to half the depth of remaining slot area. Patch'n Plug is mixed by adding one part clean water to 3.5 parts Patch'n Plug powder by volume. If slot has dried

out before Patch'n Plug application, it should be re-wetted. Remove bleeder hose and pack hole with Xypex Patch'n Plug to stop all active water flow.

### Step 6

Apply a slurry coat of Xypex Concentrate at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) in the slot over the Patch'n Plug and on the 6" (150 mm) strip of concrete surface on either side of the slot. Application may be performed by gloved hand or by brush.

### Step 7

While slurry coat is still tacky, fill slot to surface level with Xypex Concentrate in Dry-Pac consistency. Dry-Pac is mixed by adding one part clean water to six parts Xypex Concentrate powder by volume. Blend by trowel for 10 - 15 seconds only (lumps should be present in mixture). Apply the Dry-Pac by gloved hand, then compress it tightly by using a pneumatic packing tool or a hammer and block.

### Step 8

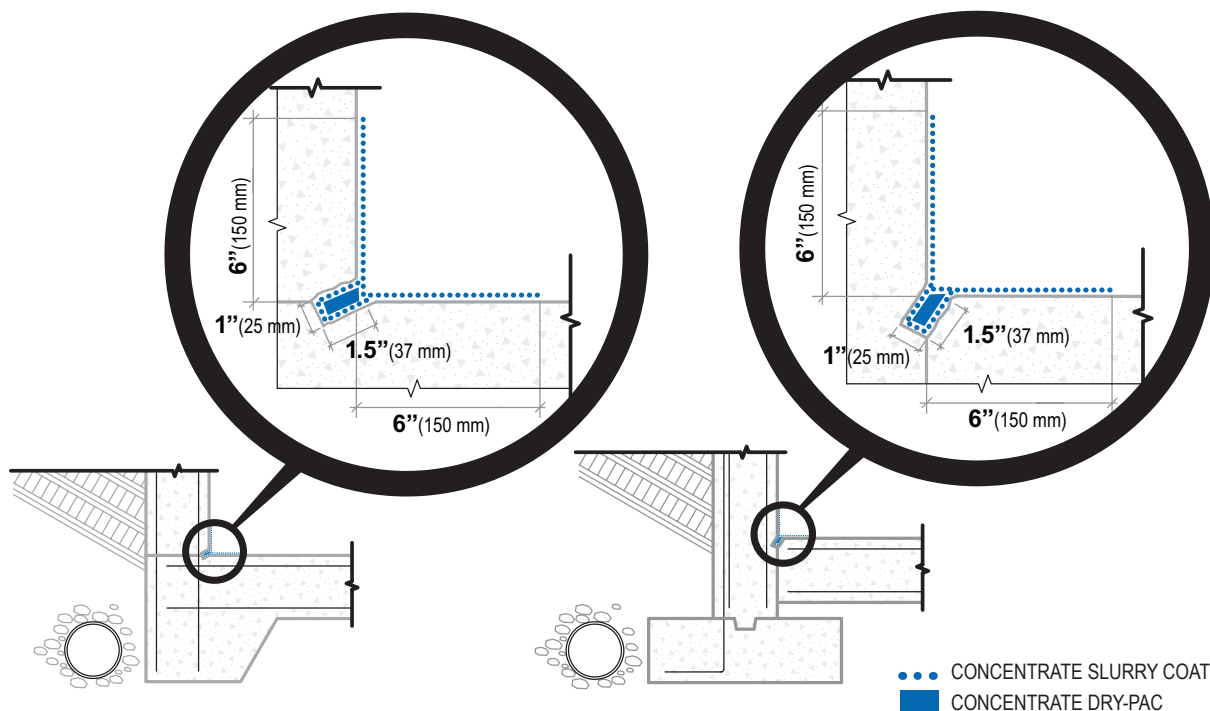
Wet the Dry-Pac surface lightly with water, then apply a slurry coat of Xypex Concentrate at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) over the repaired area and to 6" (150 mm) strip on either side of slot.

### Step 9

Cure by fog spraying periodically with water for two days or apply Xypex Gamma Cure immediately after the slurry coat has set.

## REPAIR OF SLAB INTERFACE JOINTS

No Water Flow



### Step 1

Rout out a "U" shaped slot as per the drawings shown above and depending on the wall to slab interface configuration such that the bottom corner of the slot is centered over the cold joint. The slot is to be 1" (25 mm) wide by at least 1.5" (37 mm) deep. A "V" shaped slot is not acceptable.

### Step 2

Remove all loose materials and saturate with water. Allow water to soak into concrete and then remove all surface water.

### Step 3

Apply one slurry coat of Xypex Concentrate at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) in the slot and to 6" (150 mm) up the wall and onto the slab away from the slot. Application may be performed by brush or gloved hand.

### Step 4

While slurry coat is still tacky, fill slot to surface with Xypex Concentrate Dry-Pac mixed in the following proportions: one part clean water to six parts Concentrate by volume. Blend Dry-Pac by trowel for 10 - 15 seconds only (lumps should be present in the mixture). Apply Dry-Pac by gloved hand, and then compress it tightly using a pneumatic packing device or a hammer and block.

### Step 5

Wet Dry-Pac surface lightly with water, then apply a slurry coat of Xypex Concentrate at coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) over the repaired area and to 6" (150 mm) up the wall and onto the slab away from the slot.

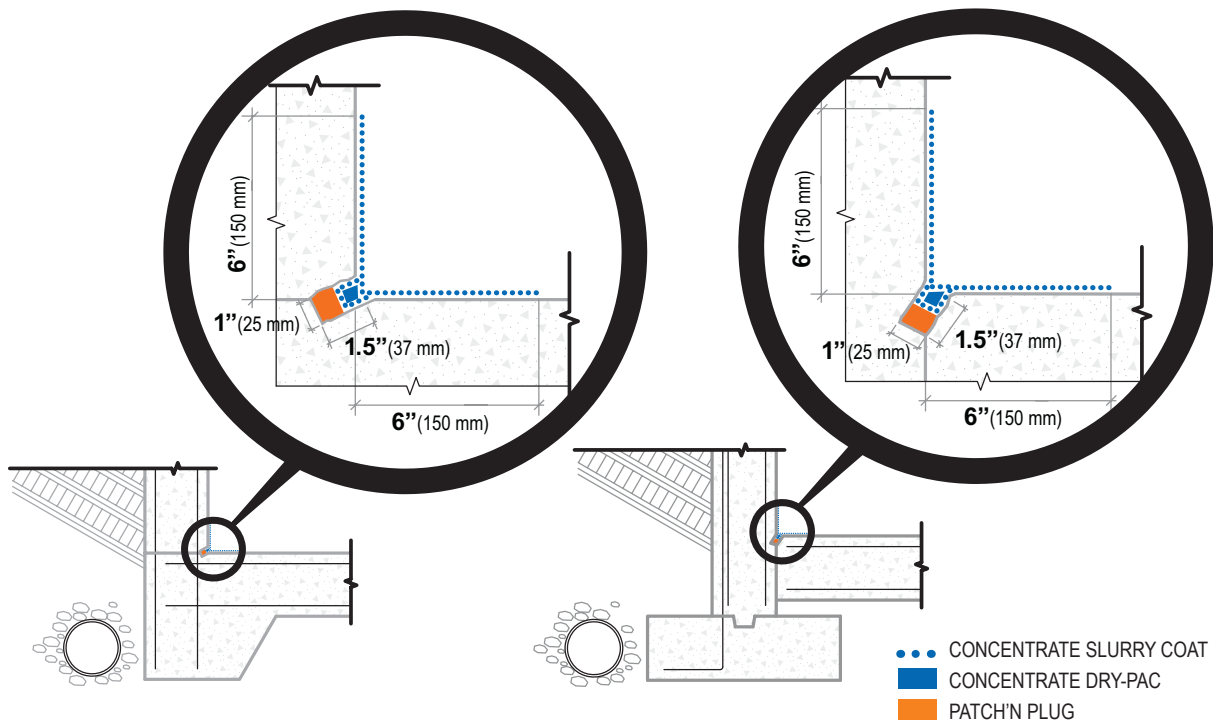
### Step 6

Cure by fog spraying periodically with water for two days or apply Xypex Gamma Cure immediately after the slurry coat has set.



## REPAIR OF SLAB INTERFACE JOINTS

Against a Flow of Water



### Step 1

Rout out a "U" shaped slot as per the drawings shown above and depending on the wall to slab interface configuration such that the bottom corner of the slot is centered over the cold joint. The slot is to be 1" (25 mm) wide by at least 1.5" (37 mm) deep. A "V" shaped slot is not acceptable. Areas with most water flow should be identified and chipped deeper.

### Step 2

Remove all loose materials and saturate with water. Allow water to soak into concrete and then remove all surface water.

### Step 3

To stop active water flow apply Xypex Patch'n Plug to half the depth of slot immediately after removing surface water. Patch'n Plug is mixed by adding one part clean water to 3.5 parts Patch'n Plug powder by volume. Patch'n Plug should be applied to full length of crack/joint area.

### Step 4

Apply a slurry coat of Xypex Concentrate at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) in the slot, over

the Patch'n Plug, and to 6" (150 mm) up the wall and onto the slab away from the slot. Application may be performed by brush or gloved hand.

### Step 5

While slurry coat is still tacky, fill slot to surface with Xypex Concentrate Dry-Pac mixed in the following proportions: one part clean water to six parts Concentrate by volume. Blend Dry-Pac by trowel for 10 - 15 seconds only (lumps should be present in the mixture). Apply Dry-Pac by gloved hand, and then compress it tightly using a pneumatic packing device or a hammer and block.

### Step 6

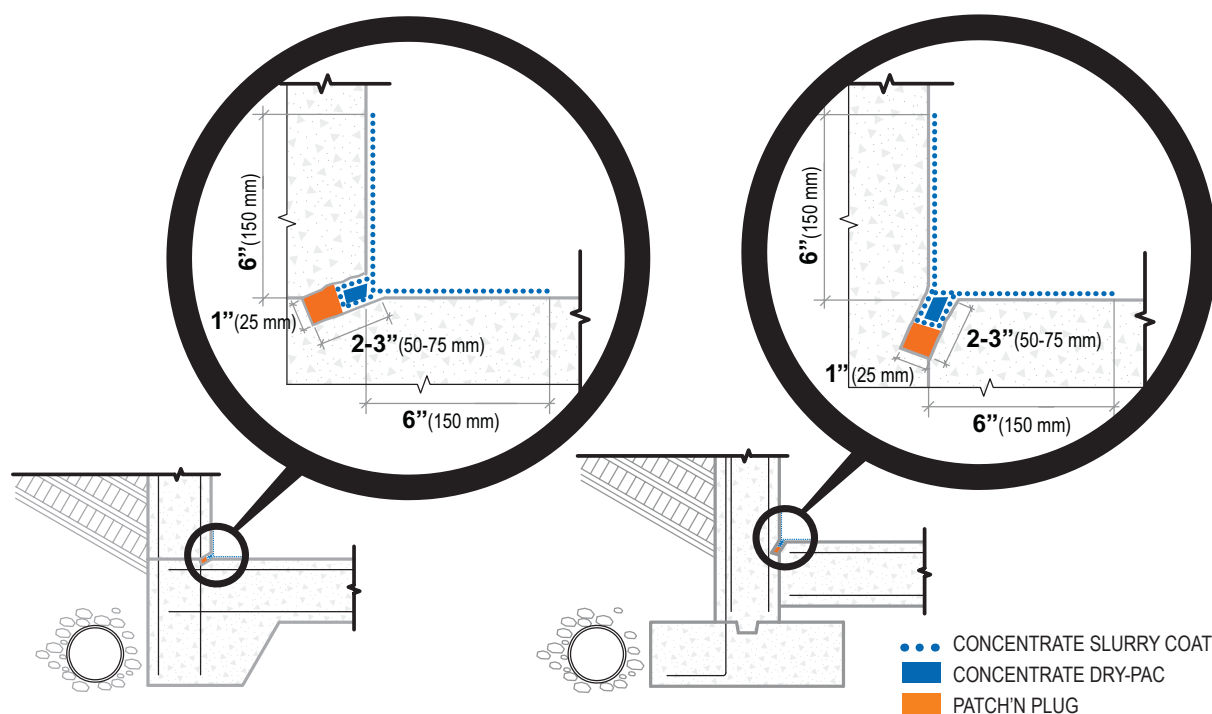
Wet Dry-Pac surface lightly with water, then apply a slurry coat of Xypex Concentrate at coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) over the repaired area and to 6" (150 mm) up the wall and onto the slab away from the slot.

### Step 7

Cure by fog spraying periodically with water for two days or apply Xypex Gamma Cure immediately after the slurry coat has set.

## REPAIR OF SLAB INTERFACE JOINTS

### Against High Pressure Flow of Water



#### Step 1

Rout out a "U" shaped slot as per the drawings shown above and depending on the wall to slab interface configuration such that the bottom corner of the slot is centered over the cold joint. The slot is to be 1" (25 mm) wide by at least 2 - 3" (50 - 75 mm) deep. A "V" shaped slot is not acceptable.

#### Step 2

In area of greatest water flow, drill hole or cavity 0.5" (13 mm) deeper into slot and over the joint to accommodate a bleeder hose. A bleeder hose is a minimum 1.5 foot (0.5 m) length of smooth surfaced, fairly rigid tubing. Its purpose is to relieve the water pressure while crack/joint is being repaired.

#### Step 3

Remove all loose materials and saturate dry areas with water. Allow water to soak into concrete and then remove all surface water.

#### Step 4

Place one end of bleeder hose into the hole or cavity and, while holding hose steady, apply Xypex Patch'n Plug to the slot around the hose. Approximately two to four applications of Patch'n Plug may be necessary to secure the hose in place and embed the tubing completely up to surface level.

#### Step 5

To stop active water flow apply Xypex Patch'n Plug to half the depth of remaining slot area. Patch'n Plug is mixed by adding one part clean water to 3.5 parts

Patch'n Plug powder by volume. If slot has dried out before Patch'n Plug application, it should be re-wetted. Remove bleeder hose and pack hole with Xypex Patch'n Plug to stop all active water flow.

#### Step 6

Apply a slurry coat of Xypex Concentrate at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) in the slot, over the Patch'n Plug, and to 6" (150 mm) up the wall and onto the slab away from the slot. Application may be performed by brush or gloved hand.

#### Step 7

While slurry coat is still tacky, fill slot to surface with Xypex Concentrate Dry-Pac mixed in the following proportions: one part clean water to six parts Concentrate by volume. Blend Dry-Pac by trowel for 10 - 15 seconds only (lumps should be present in the mixture). Apply Dry-Pac by gloved hand, and then compress it tightly using a pneumatic packing device or a hammer and block.

#### Step 8

Wet Dry-Pac surface lightly with water, then apply a slurry coat of Xypex Concentrate at coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) over the repaired area and to 6" (150 mm) up the wall and onto the slab away from the slot.

#### Step 9

Cure by fog spraying periodically with water for two days or apply Xypex Gamma Cure immediately after the slurry coat has set.



**REPAIR OF DEFECTIVE CONCRETE & HONEYCOMB****No Water Flow**

- Step 1** Rout out faulty concrete to sound concrete.
- Step 2** Remove all loose materials and saturate area with water. Allow time for concrete to absorb water, then remove all free-standing water.
- Step 3** Apply a slurry coat of Xypex Concentrate to cavity area at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).
- Step 4** While slurry coat is still tacky, fill cavity to surface with non-shrink grout. For large patches, the use of a bonding agent is recommended.
- Step 5** Allow patch to set, then apply a slurry coat of Xypex Concentrate over repaired area at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).
- Step 6** Cure by fog spraying periodically with water for two days or apply Xypex Gamma Cure immediately after the slurry coat has set.

**REPAIR OF DEFECTIVE CONCRETE & HONEYCOMB****Against a Flow of Water**

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- Step 1** Rout out faulty concrete to sound concrete.
- Step 2** Remove all loose materials and saturate the area with water. Allow time for concrete to absorb water, then remove any free-standing water.
- Step 3** To stop the flow of water, fill the cavity to surface with Xypex Patch'n Plug. For large cavities, first handrub a layer of Patch'n Plug into the cavity to help "key" the patch. Large patches may require the addition of aggregate to the Patch'n Plug. For the size and amount of aggregate, please refer to product data sheet. Where increased bonding is required, use suitable bonding agent.
- Step 4** After the patch has set, apply a slurry coat of Xypex Concentrate over repaired area at a coverage of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).
- Step 5** Cure by fog spraying periodically with water for two days or apply Xypex Gamma Cure immediately after the slurry coat has set.





**XYPEX COATING APPLICATION INSTRUCTIONS**

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## Weather and Concrete Conditions

1. The Xypex treatment must not be applied under rainy conditions or when ambient temperature is below 40°F (4°C).
2. Because Xypex requires moisture to initiate the crystalline waterproofing process, all concrete, whether fresh or old, must be saturated with water. (See Wetting Concrete below.)
3. The concrete surface must be a minimum of 20 hours old before application of the Xypex coating treatment.
4. For fresh concrete, the period between 24 hours and 72 hours is the optimum time within which to apply Xypex, as the new concrete is still “green” and requires very little pre-watering.

## Coverage

For normal surface conditions, the coverage rate for each Xypex coat is 1.25 to 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

## Surface Preparation

1. The concrete surface to be treated must be clean and free of laitance, dirt, film, paint, coatings or other foreign matter. The surface must also have an open capillary system to provide “tooth and suction” for the Xypex treatment.
2. If surface is too smooth (e.g. where steel forms are used) or if surface is covered with excess form oil or other foreign matter, the concrete should be lightly sand-blasted, water-blasted, or etched with muriatic (HCL) acid.
3. Horizontal surfaces should have a rough wood float or broom finish. Concrete laitance must be removed from surface by light sand-blasting, water-blasting or etching with muriatic (HCL) acid.
4. Surfaces to be etched with muriatic acid should be dampened with water before application of the acid. After acid etching flush concrete thoroughly with clean water.

## Structural Repair

1. Rout out cracks, faulty construction joints and other structural defects to a depth of 1.5 inches (37 mm) and a width of one inch (25 mm).
2. Apply a brush coat of Xypex Concentrate (as described below) in cavity and allow to dry for 10 minutes.
3. Fill cavity by tightly compressing Dry-Pac into the groove with pneumatic packing tool or with hammer and wood block. (See below for Dry-Pac mixing instructions.)
4. Against a direct flow of water (leakage) or where there is excess moisture due to seepage, use Xypex Patch'n Plug in lieu of Dry-Pac followed by a brush coat of Xypex Concentrate. For expansion joints or chronic moving cracks, flexible materials such as expansion joint sealants should be used.

Refer to Xypex Repair Procedures for more detailed instructions.

## Wetting Concrete

Xypex requires a saturated substrate and a damp surface. Concrete surfaces, therefore, must be thoroughly saturated with clean water prior to the application so as to aid the proper curing of the treatment and to ensure the growth of the crystalline formation deep within the pores of the concrete. Remove excess surface water before the application. If concrete surface dries out before application, it must be re-wetted.

## Mixing

1. Mix Xypex with clean water only (water that is free of salt and other deleterious materials).
2. Mix clean water into the Xypex powder with a paddle on a slow speed electric drill (250 RPM) or with other equipment that ensures adequate mixing. For small jobs, Xypex may be mixed by gloved hand or by trowel.
3. Be sure that the quantity mixed can be applied within 20 minutes. As the mixture thickens, stir frequently but do not add water.

## Mixing For Slurry Coat

Mix Xypex powder with clean water to a creamy consistency in the following volume proportions:

### For Brush Application

1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>)

2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>)

5 parts powder to 2 parts water

3 parts powder to 1 part water

### For Spray Application

1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>)

5 parts powder to 3 parts water

(ratio may vary with equipment type)

## Mixing Dry-Pac

Using a trowel, mix one part clean water with six parts Xypex Concentrate powder by volume for 10 to 15 seconds. Lumps should be present in this mixture. Do not mix more than can be applied in 20 minutes.

## Applying Xypex

1. Apply Xypex with a semi-stiff nylon bristle brush, push broom (for large horizontal surfaces), or specialized spray equipment. Do not apply Xypex with a trowel, roller, paintbrush or paint sprayer. Contact your Xypex representative for further information.
2. The Xypex coating must be uniformly applied and should be just under 0.0625 inches (1.25 mm) thick. A thicker coating can cause curing difficulties, especially in warm weather.
3. When a second coat (Xypex Concentrate or Xypex Modified) is required, it should be applied after the first coat has reached an initial set but while it is still "green" (less than 48 hours). Light pre-watering between coats may be required due to drying.
4. For slab (horizontal) applications, care should be taken to spread the Xypex evenly, pulling a heavy broom over the fresh Xypex. This should be done in long strips and will serve to eliminate settlement of the Xypex in low spots on the slab and also to remove excess material which may have been applied.
5. In hot weather it is advisable to apply Xypex either early in the morning or late in the day. This will prevent the Xypex coating from drying out too quickly.

**NOTE:** Where a smooth, steel-trowelled finish is required for horizontal slab or where slab will be exposed to traffic (e.g. parking deck), apply Xypex Concentrate DS-1 or DS-2 by dry shake method. Consult Xypex Technical Data or your Xypex representative for further information.



## Curing

1. A misty fog spray of clean water must be used for curing the Xypex treatment. Curing should begin as soon as the Xypex has set to the point where it will not be damaged by a fine spray of water.
2. Under normal conditions, it is sufficient to spray Xypex treated surfaces three times per day for two to three days. In hot or arid climates, spraying may be required more frequently to prevent premature drying of the coating.
3. During the curing period, the coating must be protected from rainfall, frost, wind, the puddling of water and temperatures below 36°F (2°C) for a period of not less than 48 hours after application. If plastic sheeting is used as protection, it must be raised off the Xypex treatment to allow the coating to breathe.
4. For concrete structures that hold liquids (e.g. swimming pools, reservoirs, wet wells, tanks, etc.), Xypex should be cured for three days and then allowed to set for 12 days before filling the structure with liquid.
5. For structures holding particularly hot and/or corrosive liquids, Xypex should be cured for three days and allowed to set for 18 days before filling.
6. In situations where there is poor air circulation (e.g. small, enclosed reservoirs or wet wells), fans or blown air may be necessary to aid the curing of Xypex.
7. Xypex Gamma Cure may be used in lieu of water curing for certain applications (consult with Xypex Chemical Corporation or your nearest Xypex distributor). Gamma Cure should be applied using a garden type sprayer and must be diluted as per directions before use. Do not apply more Gamma Cure than is specified.
8. For Xypex coated slabs that will be a wearing surface, water curing is recommended.

## Backfilling

Backfilling can take place 36 hours after the Xypex application. If backfilling takes place within seven days after the application, the backfilling material should be moist so as not to draw moisture from the Xypex coating.

## Application of Paints, Epoxies or Similar Coatings

Xypex requires 21 days of curing and crystal generation before the application of any paint or epoxy. Washing the Xypex surface with a 3 - 5% muriatic acid solution is recommended before applying the coating. Be sure to flush all acid off the surface.

## Application of Grout, Cement Parge Coat, Plaster or Stucco

It is important that any other cementitious system be applied over the Xypex coating before the Xypex crystals have had time to plug the pores of the concrete. Therefore, grouts, cement parge coats etc. should be applied after the Xypex has completely set but while it is still "green" (8 to 48 hours). Use of a bonding agent is recommended.

**NOTE:** Xypex Chemical Corporation makes no representations or warranties regarding the compatibility of Xypex products with plasters, stuccos, tiles and other surface-applied materials. It is the responsibility of the installer of these surface-applied materials to take whatever measures are necessary, including testing, to ensure acceptance by or adhesion to the Xypex treated surface.

For more instructions, alternative application methods, or information concerning the compatibility of the Xypex treatment with other products or technologies, contact the technical department of Xypex Chemical Corporation.

## Caution

Xypex is highly alkaline.

1. Avoid contact with skin or eyes.
2. Protect hands with rubber gloves when handling dry powder or wet mixture.
3. If skin comes into contact with Xypex material, wash immediately and thoroughly with water for 15 minutes. If discomfort continues, seek prompt medical attention.
4. Wear eye protection. If dry powder or wet mixture gets into eyes, flush immediately and thoroughly with water and seek medical aid.
5. Wear a suitable mask where there is potential for generating dust. If Xypex is ingested, do not induce vomiting; have affected person drink two glasses of water and obtain immediate medical attention.
6. For material safety data sheets, please contact Xypex Chemical Corporation at 604.273.5265 or toll free 800.961.4477.

Measure	Xypex Concentrate	Xypex Modified	Xypex Patch'n Plug
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#### Single Slurry Coat

lb. per sq. yd.	1.50	1.50	n/a
kg per sq. m	0.80	0.80	n/a

#### One of Two Slurry Coats

lb. per sq. yd.	1.25 - 1.50	1.25 - 1.50	n/a
kg per sq. m	0.65 - 0.80	0.65 - 0.80	n/a

#### Filling a 0.75" (19 mm) deep x 1" (25 mm) Wide Slot

lb. per lineal ft.	0.45	n/a	0.50
kg per meter	0.65	n/a	0.75

#### Filling a 1" deep (25 mm) x 1" (25 mm) Wide Slot

lb. per lineal ft.	0.55	n/a	0.60
kg per meter	0.85	n/a	0.90

#### Filling a 1.5" deep (37 mm) x 1" (25 mm) Wide Slot

lb. per lineal ft.	0.85	n/a	0.95
kg per meter	1.25	n/a	1.40

The above is a guide only. Actual usage may vary according to the project.

Using the proper tools and equipment and wearing protective clothing while working with Xypex products encourages a safer and more effective result.

## Protective Clothing and Equipment

Hard Hat  
Ear Protectors  
Eye Goggles  
Safety Glasses  
Face Shield  
Dust and Mist Mask  
Coveralls  
Knee Protectors  
Work Boots  
Leather Gloves  
Rubber Gloves  
Rain Gear  
Sandblasting Protection Gear

## Surface Preparation Equipment

Sandblaster (Pot and Hose)  
Chipping Hammer and Chisels  
Waterblaster  
Scabblers/Scarifiers  
Crack Chaser  
Compressor

## Mixing Equipment

Mixing Pail  
Electric Drill & Mixing Paddle

## Application Equipment

Semi-Stiff Concrete Brush  
Pattern Pistol (Gun & Hopper)  
Hy-Flex Spray Pump  
Quickspray Carousel Pump  
Water Sprayer  
Packing Gun with Packer Head  
Mechanical Spreader

## Miscellaneous Equipment

Extension Cords  
Flood Lights  
Industrial Vacuum (Wet/Dry Capability)  
Ladders and Scaffolding  
Maintenance Tools and Equipment  
Power Trowel  
Water Hoses and Spray Nozzles  
Ropes  
Space Heating Units  
Tarpaulins  
Ventilation Fans

For more detailed information, please contact Xypex Chemical Corporation at 604.273.5265, toll free 800.961.4477 or your local Xypex representative.





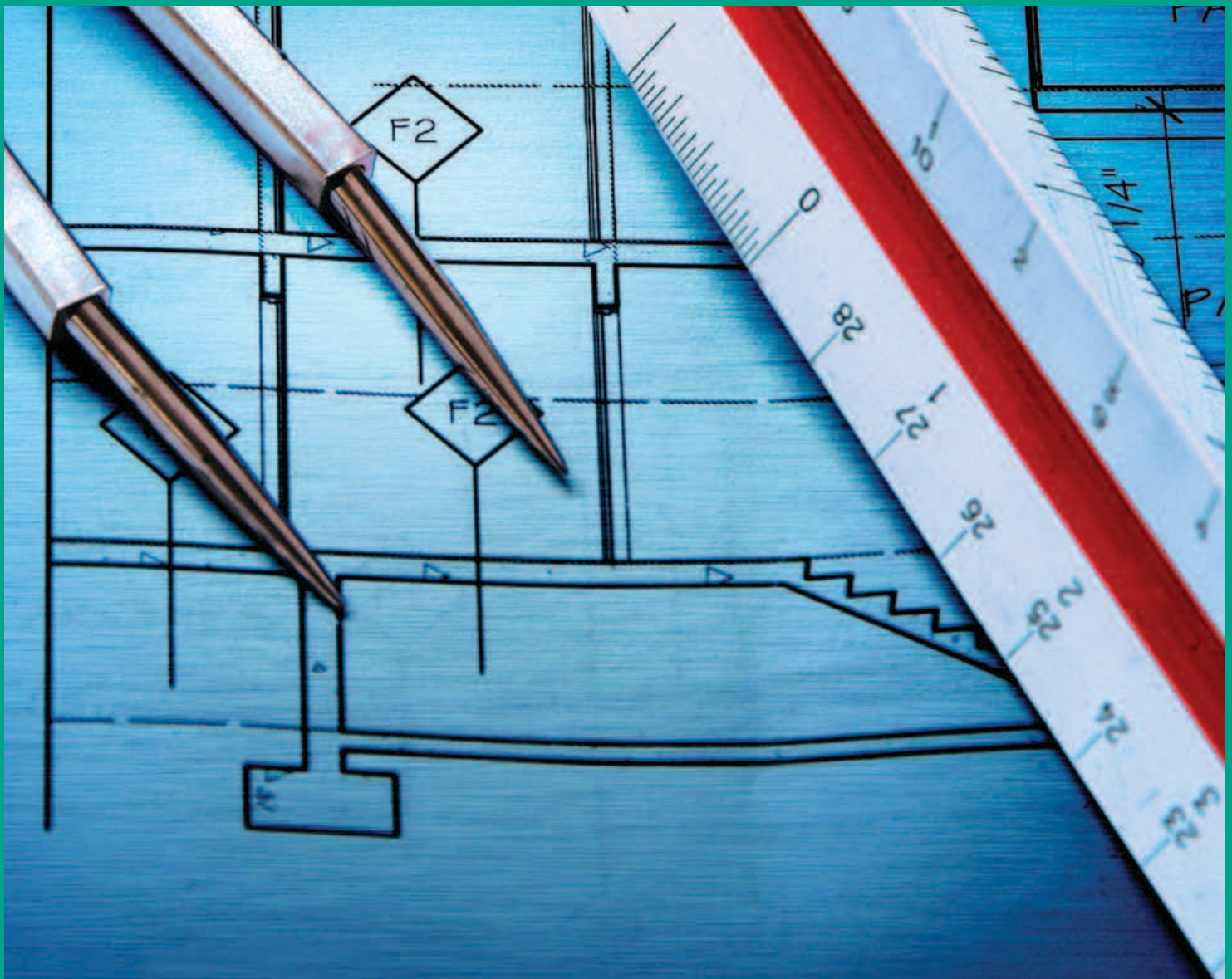




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## XYPEX SPECIFICATIONS

CSI Format • Schematic Drawings





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This section of the Xypex Specification and Application Manual utilizes the Section Format™ of the Construction Specifications Institute (CSI) Manual of Practice®. Section Format provides a uniform approach to organizing specification text by establishing a structure consisting of three primary parts: General, Products, and Execution. Text within each of the three parts is divided into articles and subordinate paragraphs and subparagraphs. The article titles serve as a checklist for consideration by the specifier. These titles are optional and selections should be based on appropriateness for the specific situation being addressed. CSI is a USA based professional society for the specifications community. Xypex Chemical Corporation is aware that other organizations with different but equally valid specification formats are available and utilized by specifiers in different parts of the world.

Contact Xypex representatives for alternative formats that incorporate local requirements and standards.



## SECTION 07160

### PART 1 – GENERAL

#### 1.01 Summary

- A. **Section Includes:** Furnishing of all labor, materials, services and equipment necessary for the supply and installation of cementitious crystalline waterproofing to concrete substrates, above-grade or below-grade, on either dry or wet side of substrates, as indicated on drawings and as specified herein.
- B. **Related Sections:**
  - 1. Section 03100 - Concrete Work
  - 2. Section 07900 - Joint Sealers
  - 3. Section 09900 - Paints and Coatings

#### 1.02 References

- A. **Applicable Standards:** The following standards are referenced herein.
  - 1. American Society for Testing and Materials (ASTM)
  - 2. Army Corps of Engineers (CRD)
  - 3. NSF International (NSF)

#### 1.03 System Description

- A. **Cementitious Crystalline Waterproofing:** Blend of portland cement, fine treated silica sand and active proprietary chemicals. When mixed with water and applied as a cementitious coating, the active chemicals cause a catalytic reaction which generates a non-soluble crystalline formation of dendritic fibers within the pores and capillary tracts of concrete. This process causes concrete to become permanently sealed against the penetration of liquids from any direction.

#### 1.04 System Performance Requirements

- A. **Testing Requirements:** Crystalline waterproofing system shall be tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance requirements as specified herein.
- B. **Independent Laboratory:** Testing shall be performed by an independent laboratory meeting the requirements of ASTM E 329-95 and certified by the United States Bureau of Standards. Testing laboratory shall obtain all concrete samples and waterproofing product samples.
- C. **Crystalline Penetration:** Crystallizing capability of waterproofing material shall be evidenced by independent SEM (Scanning Electron Microscope) photographs documenting penetration of crystal-forming waterproofing material to a depth of 2 inches (50 mm).
- D. **Permeability:** Independent testing shall be performed according to U.S. Army Corps of Engineers CRD C48-73 "Permeability of Concrete".

#### 1.04 System Performance Requirements *(continued)*

1. Concrete samples (treated and untreated) to have design strength of 2000 psi (13.8 MPa) and thickness of 2 inches (50 mm). No admixtures permitted.
  2. Coatings to have maximum thickness of 0.05 inches (1 mm) per coat with up to two coats permitted.
  3. Samples to be pressure tested to 175 psi (405 foot head of water) or 1.2 MPa (123.4 m head of water).
  4. Treated samples, after crystalline growth has occurred, shall exhibit no measurable leakage.
- E. **Chemical Resistance:** Independent testing shall be performed according to ASTM C 267-77 "Chemical Resistance of Mortars" and ASTM C 39-86 "Compressive Strength of Cylindrical Concrete Specimens".
1. Concrete samples (treated and untreated) to have design strength of 4000 psi (27.6 MPa). No admixtures permitted.
  2. Coatings to have maximum thickness of 0.05 inches (1 mm) per coat with up to two coats permitted.
  3. Untreated and treated specimens to be immersed for a minimum of 84 days in following chemical solutions: hydrochloric acid (3.5 pH), brake fluid, transformer oil, ethylene glycol, toluene, caustic soda.
  4. Treated specimens shall exhibit no detrimental effects after exposure, and shall have a minimum of 14% increase in compressive strength versus untreated control specimens.
- F. **Potable Water Approval:** Independent testing shall be performed according to NSF Standard 61 and approval for use of waterproofing material on structures holding potable water shall be evidenced by NSF certification.

#### 1.05 Submittals

- A. **General:** Submit listed submittals in accordance with conditions of the Contract and with Division 1 Submittal Procedures Section.
- B. **Product Data:** Submit product data, including manufacturer's specifications, installation instructions, and general recommendations for waterproofing applications. Also include manufacturer's certification or other data substantiating that products comply with requirements of Contract Documents.
- C. **Test Reports:** Submit for acceptance, complete test reports from approved independent testing laboratories certifying that waterproofing system conforms to performance characteristics and testing requirements specified herein.
- D. **Manufacturer's Certification:** Provide certificates signed by manufacturer or manufacturer's representative certifying that the materials to be installed comply in all respects with the requirements of this specification, and that the applicator is qualified and approved to install the materials in accordance with manufacturer's product data.
- E. **Manufacturer's Field Report:** Provide copy of report from manufacturer's representative confirming that the surfaces to which waterproofing material is to be applied are in a condition suitable to receive same.

## 1.06 Quality Assurance

- A. **Manufacturer Qualifications:** Manufacturer shall be ISO 9001 registered, and shall have no less than 10 years experience in manufacturing the cementitious crystalline waterproofing materials for the required work. Manufacturers that cannot provide the performance test data specified herein will not be considered for the project.
- B. **Applicator:** Waterproofing applicator shall be experienced in the installation of cementitious crystalline waterproofing materials as demonstrated by previous successful installations, and shall be approved by the manufacturer in writing.
- C. **Pre-Installation Conference:** Prior to installation of waterproofing, conduct meeting with waterproofing applicator, installers of work adjacent to or which penetrates waterproofing, Architect/Engineer, owner's representative, and waterproofing manufacturer's representative to verify and review the following:
  1. Project requirements for waterproofing as set out in Contract Document.
  2. Manufacturer's product data including application instructions.
  3. Substrate conditions, and procedures for substrate preparation and waterproofing installation.
- D. **Technical Consultation:** The waterproofing manufacturer's representative shall provide technical consultation on waterproofing application.

## 1.07 Delivery, Storage and Handling

- A. **Delivery:** Deliver packaged waterproofing materials to project site in original undamaged containers, with manufacturer's labels and seals intact.

## 1.08 Project Conditions

- A. **Compliance:** Comply with manufacturer's product data regarding condition of substrate to receive waterproofing, weather conditions before and during installation, and protection of the installed waterproofing system.

## 1.09 Warranty

- A. **Manufacturer's Warranty:** Manufacturer shall provide standard product warranty executed by authorized company official. Term of warranty shall be [specify term] years from Date of Substantial Completion.
- B. **Applicator's Warranty:** Applicator shall warrant the waterproofing installation against defects caused by faulty workmanship or materials for a period of [specify term] years from Date of Substantial Completion. The warranty will cover the surfaces treated and will bind the applicator to repair, at his expense, any and all leaks through the treated surfaces which are not due to structural weaknesses or other causes beyond applicator's control such as fire, earthquake, tornado and hurricane. The warranty shall read as follows:
  1. **Warranty:** The applicator warrants that, upon completion of the work, surfaces treated with cementitious crystalline waterproofing will be and will remain free from water leakage resulting from defective workmanship or materials for a period of [specify term] years from Date of Substantial Completion. In the event that water leakage occurs within the warranty period from such causes, the applicator

### 1.09 Warranty *(continued)*

shall, at his sole expense, repair, replace or otherwise correct such defective workmanship or materials. Applicator shall not be liable for consequential damages and applicator's liability shall be limited to repair, replacement or correcting of defective workmanship or materials. Applicator shall have no responsibility with respect to water leakage or other defects caused by structural failure or movement of the structure, or any other causes beyond Applicator's control.

## PART 2 – PRODUCTS

### 2.01 Materials

#### A. **Acceptable Manufacturer:**

Xypex Chemical Corporation  
13731 Mayfield Place, Richmond, B.C., Canada V6V 2G9  
Tel: 800.961.4477 or 604.273.5265 Fax: 604.270.0451

#### B. **Proprietary Products:** Xypex crystalline waterproofing materials as follows:

1. Xypex Concentrate
2. Xypex Modified
3. Xypex Patch'n Plug

**NOTE:** Supplemental specifications are available for the Xypex Admix C-series C-500, C-1000, C-2000 (admixure), and Xypex Concentrate DS-1/DS-2 (dry shake).

#### C. **Substitutions:** No substitutions permitted.

#### D. **Source Quality:** Obtain proprietary crystalline waterproofing products from a single manufacturer.

### 2.02 Mixes

#### A. **General:** Mix waterproofing material by volume with clean water which is free from salt and deleterious materials. Mix waterproofing material in quantities that can be applied within 20 to 30 minutes from time of mixing. As mixture thickens, stir frequently, but do not add additional water. Do not mix bonding agents or admixtures with crystalline waterproofing materials.

#### B. **Brush Application Mix:** Measure dry powder and place in mixing container. Measure water and mix into the dry powder with a paddle on a slow speed electric drill (250 RPM) or other type mixer which is acceptable to manufacturer. Mixing proportions shall be as follows:

Coverage	Proportions (by Volume)
1.5 lb./sq. yd. (0.8 kg/m <sup>2</sup> )	5 powder to 2 water
2.0 lb./sq. yd. (1.0 kg/m <sup>2</sup> )	3 powder to 1 water

## 2.02 Mixes *(continued)*

- C. **Spray Application Mix:** Mixing shall be same as specified for brush application except that mixture shall be thinner. Use following proportions as a guide only. Adjust proportions to match type of spray equipment and pressures used. Mixing proportions shall be as follows:

Coverage	Proportions (by Volume)
1.5 lb./sq. yd. (0.8 kg/m <sup>2</sup> )	5 powder to 3 water

- D. **Dry-Pac Mix:** Using a trowel, mix 1 part clean water with 6 parts Xypex Concentrate powder for 10 to 15 seconds. It is acceptable that lumps may be present in mixture. Mix only as much as can be applied in 15 minutes.

## PART 3 – EXECUTION

### 3.01 Examination

- A. **Site Visit:** Prior to waterproofing installation, arrange visit to project site with waterproofing manufacturer's representative. Representative shall inspect and certify that concrete surfaces are in acceptable condition to receive waterproofing treatment.
- B. **Verification of Substrates:** Verify that concrete surfaces are sound and clean, and that form release agents and materials used to cure the concrete are compatible with waterproofing treatment.
- C. **Examination for Defects:** Examine surfaces to be waterproofed for form tie holes and structural defects such as honeycombing, rock pockets, faulty construction joints and cracks. Such defects to be repaired in accordance to manufacturer's product data and 3.02 below.

### 3.02 Preparation

- A. **Concrete Finish:** Concrete surfaces to receive waterproofing treatment shall have an open capillary system to provide tooth and suction, and shall be free from scale, excess form oil, laitance, curing compounds and foreign matter. Horizontal surfaces shall have a rough wood float or broom finish. Where a smooth trowel finish is required on horizontal surface, crystalline waterproofing material shall be applied by dry shake method at time of concrete finishing in accordance with manufacturer's product data.
- B. **Surface Preparation:** Smooth surfaces (e.g. where steel forms are used) or surfaces covered with excess form oil or other contaminants shall be washed, lightly sand-blasted, water-blasted, or acid etched with muriatic acid as necessary to provide a clean absorbent surface. Surfaces to be acid-etched shall be saturated with water prior to application of acid.
- C. **Repair of Defects:** Surface defects shall be repaired in accordance with manufacturer's instructions as follows:
1. **Form Tie Holes, Construction Joints, Cracks:** Chip out defective areas in a "U" shaped slot one inch (25 mm) wide and a minimum of one inch (25 mm) deep. Clean slot of debris and dust. Soak area with water and remove excess surface water. Apply a slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) to the slot. Allow slurry to reach an initial set, then fill cavity with Dry-Pac. Compress tightly into cavity using pneumatic packer or block and hammer.

### 3.02 Preparation *(continued)*

2. **Rock Pockets, Honeycombing or Other Defective Concrete:** Rout out defective areas to sound concrete. Remove loose materials and saturate with water. Remove excess surface water and apply a slurry coat of Xypex Concentrate to area. After slurry has set, but while still “green”, fill cavity to surface level with non-shrink grout.
- D. **Wetting Concrete:** Prior to application of waterproofing treatment, thoroughly saturate concrete surfaces with clean water as required to ensure migration of crystalline chemicals into voids and capillary tracts of the concrete. Remove free surface water before application.

### 3.03 Application

- A. **Construction Joints:** Apply Xypex Concentrate in slurry form at a rate of 2.0 lb./sq. yd. (1.08 kg/m<sup>2</sup>) to joint surfaces between concrete pours. Moisten surfaces prior to slurry application. Where joint surfaces are not accessible prior to pouring new concrete, consult manufacturer for application procedure.
- B. **Sealing Strips and Coves:** Prepare concrete surfaces that will come into contact with sealing strips and coves by applying one coat of Xypex Concentrate in slurry form at a rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>). Then apply Xypex Concentrate in Dry-Pac form (sealing strip) or Xypex Modified in mortar consistency (cove) after slurry coat has reached an initial set but is still “green”.
  1. **Sealing Strips:** Where indicated on drawings, fill preformed grooves, one inch (25 mm) wide and minimum of 1.5 inch (37 mm) deep, located at construction joints with Xypex Concentrate in Dry-Pac form. Compact Dry-Pac tightly into groove using a pneumatic packer or hammer and block.
  2. **Coves:** Where indicated on drawings, trowel apply and pack Xypex Modified mortar into a cove shape.
- C. **Surface Application:** After repairs, surface preparation, treatment of construction joints and sealing strip placement have been completed in accordance with manufacturer’s product data and as specified herein, apply Xypex treatment uniformly to concrete surfaces with semi-stiff bristle brush or broom, or suitable spray equipment. Application rates and locations shall be as indicated in the drawings and in accordance with manufacturer’s product data. When brushing, work slurry well into surface of the concrete, filling surface pores and hairline cracks. When spraying, hold nozzle close enough to ensure that slurry is forced into pores and hairline cracks.
  1. **First Coat (of one or two coat application):** Apply Xypex Concentrate slurry coat to locations indicated on drawings in accordance with manufacturer’s product data.
  2. **Second Coat (of two coat application):** Where indicated on drawings or as required by manufacturer’s product data, apply Xypex Modified slurry coat while first coat of Xypex Concentrate is still “green” but after it has reached an initial set. Use light prewatering between coats when rapid drying conditions exist.
- D. **Sandwich (Topping) Application:** When treated structural slabs are to receive a concrete or other topping, place the topping while waterproofing material is still “green” but has reached an initial set. Lightly prewater when rapid drying conditions exist.



### 3.04 Curing

- A. **General:** Begin curing as soon as Xypex coating has hardened sufficiently so as not to be damaged by a fine spray. Cure Xypex treatment with a mist fog spray of clean water three times a day for 2 to 3 days, or cover treated surfaces with damp burlap for the prescribed period. In warm climates, more than three sprayings per day may be necessary to prevent excessive drying of coating.
- B. **Air Circulation:** Do not lay plastic sheeting directly on the waterproofing coating as air contact is required for proper curing. If poor circulation exists in treated areas, it may be necessary to provide fans or blown air to aid in curing of waterproofing treatment.
- C. **Holding Structures:** For concrete holding structures such as swimming pools, reservoirs, water treatment tanks and wet wells, cure Xypex treatment for three days and then allow treatment to set (air cure) for 12 days before filling structure with liquid. For structures holding hot or corrosive liquids, cure waterproofing treatment for three days and allow to set for 18 days before filling.
- D. **Protection:** During the curing period, protect treated surfaces from damage by wind, sun, rain and temperatures below 36°F (2°C). If plastic sheeting is used for protection, it must be raised off of waterproofing coating to allow sufficient air circulation.
- E. **Curing Agent:** If moist curing is not possible, use a chemical curing agent that is specifically designed for or compatible with the approved crystalline waterproofing treatment. Curing agent shall have at least two years of successful field use and shall be approved by waterproofing manufacturer in writing.

### 3.05 Interface With Other Materials

- A. **Backfilling:** Do not backfill for 36 hours after application. If backfill takes place within seven days after application, then backfill material shall be moist so as not to draw moisture from waterproof coating.
- B. **Paint, Epoxy or Similar Coatings:** Do not apply paint or other coatings until waterproofing treatment has cured and set for a minimum of 21 days. Before applying paint or coating, neutralize treated surface by dampening with water and then washing waterproofed surface with 15% muriatic acid, diluted in a ratio of one part acid to four parts water by volume. Flush acid off treated concrete surfaces.
- C. **Grout, Cement Parge Coat, Plaster or Stucco:** Because the waterproof coating forms a relatively smooth surface and the resulting crystalline formation fills the concrete pores thereby reducing suction characteristics of the concrete, it may be necessary to use a suitable bonding agent for proper bonding of cementitious systems. Trial applications are recommended to ensure that adhesion requirements are satisfied.
- D. **Responsibility to Ensure Compatibility:** Xypex Chemical Corporation makes no representations or warranties regarding compatibility of Xypex treatment with coatings, plasters, stuccos, tiles or other surface-applied materials. It shall be the responsibility of the installer of the surface-applied material that is to be applied over the Xypex waterproofing treatment, to take whatever measures are necessary, including testing, to ensure acceptance by or adhesion to the waterproofing treatment.

### 3.06 Field Quality Control

- A. **Observation:** Do not conceal installed waterproofing system before it has been observed by Architect/Engineer, waterproofing manufacturer's representative and other designated entities.
- B. **Flood Testing:**
  - 1. Perform flood test on completed waterproofing installation before placement of other construction.
  - 2. Plug or dam drains and fill area with water to a depth of two inches (50 mm) or to within 0.5 inch (12.5 mm) of top of waterproofing treatment.
  - 3. Let water stand for 24 hours.
  - 4. If leaks are discovered, make repairs and repeat test until no leaks are observed.

### 3.07 Cleaning and Protection

- A. **Cleaning:** Clean spillage and soiling from adjacent surfaces using appropriate cleaning agents and procedures.
- B. **Protection:** Take measures to protect completed Xypex coating from damage after application. Do not permit traffic on unprotected coating.

END OF SECTION 07160

## SECTION 03050

### PART 1 – GENERAL

#### 1.01 Summary

- A. **Section Includes:** Furnishing of all labor, materials, services and equipment necessary for the supply and installation of crystalline waterproofing additive to concrete structures as indicated on the drawings and as specified herein. The crystalline waterproofing material shall be added to concrete during the mixing cycle, and shall be used in above or below-grade walls and slabs, including liquid retaining structures where enhanced chemical resistance is required.
- B. **Related Sections:**
  - 1. Section 03100 - Concrete Work
  - 2. Section 03200 - Concrete Reinforcement
  - 3. Section 07900 - Joint Sealers

#### 1.02 References

- A. **Applicable Standards:** The following standards are referenced herein.
  - 1. American Society for Testing and Materials (ASTM)
  - 2. Army Corps of Engineers (CRD)
  - 3. American Concrete Institute (ACI)
  - 4. NSF International (NSF)

#### 1.03 System Description

- A. **Crystalline Waterproofing Additive:** Concrete waterproofing system shall be of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.

#### 1.04 System Performance Requirements

- A. **Testing Requirements:** Crystalline waterproofing system shall be tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance requirements as specified herein.
- B. **Independent Laboratory:** Testing shall be performed by an independent laboratory meeting the requirements of ASTM E 329-90 and certified by the United States Bureau of Standards. Testing laboratory shall obtain all concrete samples and waterproofing product samples.
- C. **Crystalline Formation:** Crystallizing capability of waterproofing system shall be evidenced by independent SEM (Scanning Electron Microscope) photographs showing crystalline formations within the concrete matrix.

#### 1.04 System Performance Requirements *(continued)*

- D. **Permeability:** Independent testing shall be performed according to U.S. Army Corps of Engineers CRD-C48-73 "Permeability of Concrete". Treated concrete samples shall be pressure tested to 150 psi (350 foot head of water) or 1.05 MPa (106 m head of water). The treated samples shall exhibit no measurable leakage.
- E. **Chemical Resistance:** Independent testing shall be performed to determine "Sulfuric Acid Resistance of Concrete Specimens". Treated concrete samples (dosage rates of 3%, 5% and 7%) shall be tested against untreated control samples. All samples shall be immersed in sulfuric acid and weighed daily until a control sample reaches a weight loss of 50% or over. On final weighing the percentage weight loss of the treated samples shall test significantly lower than the control samples.
- F. **Compressive Strength:** Independent testing shall be performed according to ASTM C39 "Compressive Strength of Cylindrical Concrete Specimens". Concrete samples containing the crystalline waterproofing additive shall be tested against untreated control sample. At 28 days, the treated samples shall exhibit the same or better compressive strength over the control.
- G. **Potable Water Approval:** Independent testing shall be performed according to NSF Standard 61, and approval for use of waterproofing material on structures holding potable water shall be evidenced by NSF certification.

#### 1.05 Submittals

- A. **General:** Submit listed submittals in accordance with conditions of the Contract and with Division 1 Submittal Procedures Section.
- B. **Product Data:** Submit product data, including manufacturer's specifications, installation instructions, and general recommendations for waterproofing applications. Also include manufacturer's certification or other data substantiating that products comply with requirements of Contract Documents.
- C. **Test Reports:** Submit, for acceptance, complete test reports from approved independent testing laboratories certifying that waterproofing system conforms to performance characteristics and testing requirements specified herein.
- D. **Manufacturer's Certification:** Provide certificate signed by manufacturer or manufacturer's representative certifying that the materials to be installed comply in all respects with the requirements of this specification.

#### 1.06 Quality Assurance

- A. **Manufacturer Qualifications:** Manufacturer to be ISO 9001 registered, and to have no less than 10 years experience in manufacturing the crystalline waterproofing additive for the required work. Manufacturer must be capable of providing field service representation during construction phase. Manufacturers that cannot provide the performance test data specified herein will not be considered for the project.
- B. **Applicator:** Installer of crystalline waterproofing additive shall be approved by the manufacturer or manufacturer's representative in writing.
- C. **Pre-Installation Conference:** Prior to installation of waterproofing, conduct meeting with Architect/Engineer, owner's representative, applicator (concrete supplier), concrete placer and waterproofing manufacturer's representative to verify and review the following:

### 1.06 Quality Assurance *(continued)*

1. Project requirements for waterproofing as set out in Contract Document.
  2. Manufacturer's product data including application instructions.
- D. **Technical Consultation:** The waterproofing manufacturer's representative shall provide technical consultation on waterproofing application.

### 1.07 Delivery, Storage and Handling

- A. **Ordering:** Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. **Delivery:** Deliver packaged waterproofing materials to project site in original undamaged containers, with manufacturer's labels and seals intact.
- C. **Storage:** Store waterproofing materials in dry, enclosed location, at temperature and humidity conditions recommended by manufacturer.

### 1.08 Warranty

- A. **Project Warranty:** Refer to conditions of the Contract for project warranty provisions.
- B. **Manufacturer's Warranty:** Manufacturer shall provide standard product warranty executed by authorized company official. Term of warranty shall be [specify term] years from Date of Substantial Completion.

## PART 2 – PRODUCTS

### 2.01 Materials

- A. **Acceptable Manufacturer:**

Xypex Chemical Corporation  
 13731 Mayfield Place, Richmond, B.C., Canada V6V 2G9  
 Tel: 800.961.4477 or 604.273.5265 Fax: 604.270.0451  
 E-mail: info@xypex.com Website: www.xypex.com

- B. **Proprietary Products:** Xypex crystalline waterproofing materials as follows:

1. Xypex Admix C-500
2. Xypex Admix C-1000
3. Xypex Admix C-2000

**NOTE:** Supplemental specifications (including dosage rates) are available for Xypex Admix C-500 NF (no fines grade), Xypex Admix C-1000 NF (no fines grade) and Xypex Admix C-2000 NF (no fines grade).

- C. **Substitutions:** No substitutions permitted.
- D. **Source Quality:** Obtain proprietary crystalline waterproofing products from a single manufacturer.

## 2.02 Dosage

- A. **General:** Xypex Admix must be added to concrete mix at time of batching.
- B. **Dosage Rate:** Under normal conditions, the crystalline waterproofing powder shall be added to the concrete mix at the following rates:

Xypex Admix C-500	2 - 3% by weight of portland cement content
Xypex Admix C-1000	2 - 3% by weight of portland cement content
Xypex Admix C-2000	2% by weight of portland cement content
Xypex Admix NF (no fines grade)	1 - 1.5% by weight of Portland cement content

For enhanced chemical protection or meeting specific project requirements, or where the concrete mix design contains higher than 20% fly ash content or includes a portland cement/slag cement blend, consult with manufacturer or its authorized representative to determine appropriate dosage rates.

## PART 3 – EXECUTION

### 3.01 Manufacturer's Instructions

- A. **Compliance:** Comply with manufacturer's product data regarding installation, including technical bulletins, product catalogue, installation instructions and product packaging labels.

### 3.02 Project Conditions

- A. **Reinforcement:** All reinforcement shall be rib deformed bar in accordance with applicable standards. Exposed concrete decks (joint free) shall contain sufficient reinforcement to minimize thermal movement and control cracking.
- B. **Setting Time and Strength:** Some retardation of set may occur when using Xypex Admix products. The amount of retardation will depend upon the concrete mix design, the particular Admix product used, dosage rate of the Admix, temperature of the concrete and climatic conditions. Concrete containing a Xypex Admix product may develop higher ultimate strengths than plain concrete. Conduct trial mixes under project conditions to determine setting time and strength of the concrete. Consult with manufacturer or manufacturer's representative regarding concrete mix design, project conditions and proper dosage rate.
- C. **Weather Conditions:** For mixing, transporting and placing concrete under conditions of high temperature or low temperature, follow concrete practices as referred to in ACI 305R-77 (Hot Weather Concreting) and ACI 306R-78 (Cold Weather Concreting). For flatwork being placed in either hot, dry or windy conditions use of monomolecular film (evaporation retardant) is recommended to control loss of bleed water.

### 3.03 Application

- A. **General:** Xypex Admix shall be added to the concrete mix at time of batching. Thorough blending of the Xypex Admix throughout the concrete mix is essential for correct performance of the product and, therefore, care should be taken to ensure that a homogeneous mixture is obtained.



### 3.03 Application *(continued)*

- B. **Concrete Batching & Mixing:** Procedures for mixing will vary according to type of batch plant operation and equipment.
1. **Ready Mix Plant - Dry Batching Operation:** Add Xypex Admix powder to drum of ready-mix truck, then add 60% - 70% of required water along with 300 - 500 lb. (136 - 227 kg) of aggregate. Mix the materials for 2 - 3 minutes to ensure that the Admix is distributed evenly throughout the mix water. Add balance of materials to the ready-mix truck and mix in accordance with standard batch practices.
  2. **Ready Mix Plant - Central Mix Operation:** Mix Xypex Admix with water to form a very thin slurry (e.g. 15 - 20 lb. or 6.75 - 9 kg of powder mixed with 3 gallons or 13.6 litres of water). Pour the required amount of material into the drum of ready-mix truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready-mix truck). Pour the concrete into the truck and mix for at least 5 minutes to ensure even distribution of the Xypex Admix throughout the concrete.
  3. **Precast Batch Plant - Pan Type Mixer:** Add Xypex Admix to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

### 3.04 Curing

- A. **General:** Concrete containing Xypex Admix shall be moist cured in accordance with ACI Reference 308, "Standard Practice for Curing Concrete".
- B. **Curing Compounds:** Curing compounds may be used in the event that project requirements or conditions prevent moist curing. Curing compounds shall comply with ASTM C-309.

### 3.05 Protection

- A. **Protection:** Protect installed product and finished surfaces from damage during construction.

### 3.06 Field Quality Control

- A. **Examination for Defects:** Do not conceal Xypex treated concrete before it has been observed by Architect/Engineer, waterproofing manufacturer's representative and other designated entities. Concrete shall be examined for structural defects such as faulty construction joints, cold joints and cracks. Such defects to be repaired in accordance with manufacturer's repair procedures.
- B. **Flood Testing for Suspended Slabs:**
1. Perform flood test on completed waterproofing installation before placement of other construction.
  2. Plug or dam drains and fill area with water to a depth of two inches (50 mm) or to within 0.5 inch (12.5 mm) of top of waterproofing treatment.
  3. Let water stand for 24 hours.
  4. If leaks are discovered, make repairs and repeat test until no leaks are observed.

### 3.07 Interaction With Other Materials

- A. **Backfilling:** Normal backfilling procedures may be used after concrete has been cured for at least seven days. If backfill takes place within seven days after concrete placement, then backfill material shall be moist so as not to draw moisture from the concrete. In no event shall backfilling take place before concrete has gained sufficient strength to withstand the applied load.
- B. **Grout, Cement Parge Coat, Plaster or Stucco:** Because concrete containing Xypex Admix forms a relatively smooth surface and the resulting crystalline formation fills the concrete pores thereby reducing suction characteristics of the concrete, it may be necessary to use a suitable bonding agent for proper bonding of cementitious systems.
- C. **Responsibility to Ensure Compatibility:** Xypex Admix products are compatible with most admixtures used in the production of quality concrete. However, Xypex Chemical Corporation makes no representations or warranties regarding such compatibility of Xypex Admix products with other additives or admixtures, nor regarding compatibility of the Xypex treated concrete with coatings, plasters, stuccos, tiles or other surface-applied materials. It shall be the responsibility of the concrete contractor to take whatever measures are necessary, including testing, to ensure compatibility of the Xypex Admix with other additives or admixtures being used in the concrete mix, and it shall be the responsibility of the installer of the surface-applied material that is to be applied over the Xypex treated concrete to take whatever measures are necessary, including testing, to ensure acceptance by or adhesion to the Xypex treated concrete.

END OF SECTION 03050

## SECTION 07160

### PART 1 – GENERAL

#### 1.01 Summary

- A. **Section Includes:** Furnishing of all labor, materials, services and equipment necessary for the supply and installation of cementitious crystalline waterproofing (dry shake) to horizontal concrete surfaces as indicated on drawings and as specified herein.
- B. **Related Sections:**
  - 1. Section 03100 - Concrete Work
  - 2. Section 03300 - Cast-In-Place Concrete
  - 3. Section 03360 - Concrete Finishing

#### 1.02 References

- A. **Applicable Standards:** The following standards are referenced herein.
  - 1. American Society for Testing and Materials (ASTM)
  - 2. Army Corps of Engineers (CRD)
  - 3. American Concrete Institute (ACI)

#### 1.03 System Description

- A. **Cementitious Crystalline Waterproofing (Dry Shake):** Blend of portland cement, active proprietary chemicals and aggregate that has been graded and crushed to particle sizes suitable for concrete floors. When applied as a dry shake to freshly poured concrete slabs, the active chemicals cause a catalytic reaction which generates a non-soluble crystalline formation of dendritic fibers within the pores and capillary tracts of concrete. This process causes concrete to become permanently sealed against the penetration of liquids from any direction. For areas where increased abrasion resistance is required, the dry shake waterproofing shall contain a proprietary aggregate hardener.

#### 1.04 System Performance Requirements

- A. **Testing Requirements:** Crystalline waterproofing system shall be tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance requirements as specified herein.
- B. **Independent Laboratory:** Testing shall be performed by an independent laboratory meeting the requirements of ASTM E 329-90 and certified by the United States Bureau of Standards. Testing laboratory shall obtain all concrete samples and waterproofing product samples.
- C. **Crystalline Penetration:** Crystallizing capability of waterproofing material shall be evidenced by independent SEM (Scanning Electron Microscope) photographs documenting penetration of crystal-forming waterproofing material to a depth of 2 inches (50 mm).

#### 1.04 System Performance Requirements *(continued)*

- D. **Permeability:** Independent testing shall be performed according to U.S. Army Corps of Engineers CRD C48-73 "Permeability of Concrete".
  - 1. Concrete samples (treated and untreated) to have design strength of 2000 psi (13.8 MPa) and thickness of 2 inches (50 mm). No admixtures permitted.
  - 2. Samples to be pressure tested to 175 psi (405 foot head of water) or 1.2 MPa (123.4 m head of water).
  - 3. Treated samples, after crystalline growth has occurred, shall exhibit no measurable leakage.
- E. **Chemical Resistance:** Independent testing shall be performed according to ASTM C267-82 (1990) and ASTM C39-86 "Chemical Resistance of Mortars".
  - 1. Concrete samples (treated and untreated) to have design strength of 4000 psi (27.6 MPa). No admixtures permitted.
  - 2. Untreated and treated specimens to be immersed for a minimum of 84 days in the following chemical solutions: hydrochloric acid (3.5 pH), brake fluid, transformer oil, ethylene glycol, toluene, caustic soda.
  - 3. Treated specimens shall exhibit no detrimental effects after exposure, and shall have a minimum of 14% increase in compressive strength versus untreated control specimens.

#### 1.05 Submittals

- A. **General:** Submit listed submittals in accordance with conditions of the Contract and with Division 1 Submittal Procedures Section.
- B. **Product Data:** Submit product data, including manufacturer's specifications, installation instructions, and general recommendations for waterproofing applications. Also include manufacturer's certification or other data substantiating that products comply with requirements of Contract Documents.
- C. **Test Reports:** Submit, for acceptance, complete test reports from approved independent testing laboratories certifying that waterproofing system conforms to performance characteristics and testing requirements specified herein.
- D. **Manufacturer's Certification:** Provide certificates signed by manufacturer or manufacturer's representative certifying that the materials to be installed comply in all respects with the requirements of this specification, and that the applicator is qualified and approved to install the materials in accordance with manufacturer's product data.

#### 1.06 Quality Assurance

- A. **Manufacturer Qualifications:** Manufacturer should be ISO 9001 registered, and shall have no less than 10 years experience in manufacturing the cementitious crystalline waterproofing materials (dry shake) for the required work. Manufacturers that cannot provide the performance test data specified herein will not be considered for the project.

### 1.06 Quality Assurance *(continued)*

- B. **Applicator:** Waterproofing applicator shall be experienced in the installation of dry shake cementitious materials as demonstrated by previous successful installations, and shall be approved by the manufacturer in writing.
- C. **Pre-Installation Conference:** Prior to installation of waterproofing, conduct meeting with waterproofing applicator, concrete placer, concrete finisher, Architect/Engineer, owner's representative, and waterproofing manufacturer's representative to verify and review the following:
  1. Project requirements for waterproofing as set out in Contract Document.
  2. Manufacturer's product data including application instructions.
  3. Procedures for substrate preparation, waterproofing installation and concrete finishing.
- D. **Technical Consultation:** The waterproofing manufacturer's representative shall provide technical consultation on waterproofing application.

### 1.07 Delivery, Storage and Handling

- A. **Ordering:** Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. **Delivery:** Deliver packaged waterproofing materials to project site in original undamaged containers, with manufacturer's labels and seals intact.
- C. **Storage:** Store waterproofing materials in dry, enclosed location.

### 1.08 Warranty

- A. **Manufacturer's Warranty:** Manufacturer shall provide standard product warranty executed by authorized company official. Term of warranty shall be [specify term] years from Date of Substantial Completion.
- B. **Applicator's Warranty:** Applicator shall warrant the waterproofing installation against defects caused by faulty workmanship or materials for a period of [specify term] years from Date of Substantial Completion. The warranty will cover the surfaces treated and will bind the applicator to repair, at his expense, any and all leaks through the treated surfaces which are not due to structural weaknesses or other causes beyond applicator's control such as fire, earthquake, tornado and hurricane. The warranty shall read as follows:
  1. **Warranty:** The applicator warrants that, upon completion of the work, surfaces treated with cementitious crystalline waterproofing will be and will remain free from water leakage resulting from defective workmanship or materials for a period of [specify term] years from Date of Substantial Completion. In the event that water leakage occurs within the warranty period from such causes, the applicator shall, at its sole expense, repair, replace or otherwise correct such defective workmanship or materials. Applicator shall not be liable for consequential damages and applicator's liability shall be limited to repair, replacement or correcting of defective workmanship or materials. Applicator shall have no responsibility with respect to water leakage or other defects caused by structural failure or movement of the structure, or any other causes beyond Applicator's control.

## PART 2 – PRODUCTS

### 2.01 Materials

#### A. **Acceptable Manufacturer:**

Xypex Chemical Corporation  
13731 Mayfield Place, Richmond, B.C., Canada V6V 2G9  
Tel: 800.961.4477 or 604.273.5265 Fax: 604.270.0451  
E-mail: info@xypex.com Website: www.xypex.com

#### B. **Proprietary Products:** Xypex crystalline waterproofing materials as follows:

1. Xypex Concentrate DS-1 (general applications)
2. Xypex Concentrate DS-2 (where enhanced abrasion resistance is required)

**NOTE:** Supplemental specifications are available for Xypex Concentrate and Modified (coatings) and Xypex Admix C-500, C-1000, and C-2000 (additives).

#### C. **Substitutions:** No substitutions permitted.

#### D. **Source Quality:** Obtain proprietary crystalline waterproofing products from a single manufacturer.

### 2.02 Coverage

#### A. **Dry Shake Materials:** Coverage rate for cementitious crystalline waterproofing shall be as follows:

Xypex Concentrate DS-1	1.75 lb per sq. yd. (0.95 kg/m <sup>2</sup> )
Xypex Concentrate DS-2	6.75 - 7.5 lb sq. yd. (3.6 - 4.0 kg/m <sup>2</sup> )

When using Xypex Concentrate DS-2 for enhanced impact and abrasion resistance, consult with manufacturer or its authorized representative to determine appropriate coverage rate.

## PART 3 – EXECUTION

### 3.01 Manufacturer's Instructions

#### A. **Compliance:** Comply with manufacturer's product data regarding installation, including technical bulletins, product catalogue, installation instructions and product packaging labels.

### 3.02 Project Conditions

#### A. **Air Entrainment:** For best results, air content of the concrete should not exceed 3%. If higher entrained air content is specified (e.g. for concrete that will be exposed to freeze-thaw cycle), consult with a manufacturer's technical representative for further application information.

#### B. **Joint Sealants:** Suitable flexible sealant shall be used for joints and chronic moving cracks.



### 3.02 Project Conditions *(continued)*

- C. **Weather Conditions:** In hot, dry, windy conditions, or where the use of a super-plasticizer will reduce amount of bleed water available for the dry shake material, consult with manufacturer's technical representative for additional or alternative application procedures.

### 3.03 Application

- A. **General:** Apply cementitious crystalline waterproofing (dry shake) after placement, consolidation and leveling of fresh concrete.
- B. **Concentrate DS-1:** Wait until fresh concrete can be walked on leaving an indentation of 1/4 - 3/8 in. (6.5 - 9.5 mm), then power float the surface (the concrete should be free of bleed water before power floating). Immediately after floating open the surface, apply the dry shake material evenly by hand or mechanical spreader. As soon as the dry shake material has absorbed moisture from the fresh base slab, power float the material into the surface (do not use a trowel). Thoroughly work the powder into the cement paste. When concrete has hardened sufficiently, power trowel concrete surface to the required finish.
- C. **Concentrate DS-2:** Wait until fresh concrete can be walked on leaving an indentation of 1/4 - 3/8 in. (6.5 - 9.5 mm), then power float the surface (the concrete should be free of bleed water before power floating). Immediately after floating open the surface, apply one half of the required dry shake material evenly by hand or mechanical spreader. Then, after power floating the initial portion of the powder into the surface, apply the remaining dry shake material at right angles to the first application, and power float (do not use a trowel) the material into the surface. Thoroughly work the powder into the cement paste. When concrete has hardened sufficiently, power trowel concrete surface to the required finish.
- D. **Slab Edges:** Where edges of concrete slab set up earlier than main body of concrete, apply dry shake material to edges and finish with hand tools prior to proceeding with the dry shake application to the main body of concrete slab.

### 3.04 Curing

- A. **General:** Begin curing as soon as concrete has reached a final set but before the surface starts to dry. Conventional moist curing procedures such as water spray, wet burlap or plastic covers may be used in accordance with ACI Reference 308, "Standard Practice for Curing Concrete".
- B. **Curing Compounds:** Curing compounds may be used in the event that project requirements or conditions prevent moist curing. Curing compounds shall comply with ASTM C-309.
- C. **Protection:** During the curing period, protect treated surfaces from damage by wind, sun, rain and temperatures below 32°F (0°C).

### 3.05 Interface With Other Materials

- A. **Paint, Epoxy or Similar Coatings:** Do not apply paint or other coatings until waterproofing treatment has cured and set for a minimum of 21 days. Before applying paint or coating, neutralize treated surface by dampening with water and then washing waterproofed surface with 15% muriatic acid, diluted in a ratio of one part acid to four parts water by volume. Flush acid off treated concrete surfaces.

### 3.05 Interface With Other Materials *(continued)*

- B. **Grout, Cement Parge Coat, Concrete Topping:** Because the waterproof treatment forms a relatively smooth surface and the resulting crystalline formation fills the concrete pores thereby reducing suction characteristics of the concrete, it may be necessary to use a suitable bonding agent for proper bonding of cementitious systems.
- C. **Responsibility to Ensure Compatibility:** Xypex Chemical Corporation makes no representations or warranties regarding compatibility of Xypex treatment with coatings, plasters, stuccos, tiles or other surface-applied materials. It shall be the responsibility of the installer of the surface-applied material that is to be applied over the Xypex waterproofing treatment, to take whatever measures are necessary, including testing, to ensure acceptance by or adhesion to the waterproofing treatment.

### 3.06 Field Quality Control

- A. **Examination for Defects:** Do not conceal Xypex treated concrete before it has been observed by Architect/Engineer, waterproofing manufacturer's representative and other designated entities. Concrete shall be examined for structural defects such as faulty construction joints, cold joints and cracks. Such defects to be repaired in accordance with manufacturer's repair procedures.
- B. **Flood Testing:**
  - 1. Perform flood test on completed waterproofing installation before placement of other construction.
  - 2. Plug or dam drains and fill area with water to a depth of two inches (50 mm) or to within 0.5 inch (12.5 mm) of top of waterproofing treatment.
  - 3. Let water stand for 24 hours.
  - 4. If leaks are discovered, make repairs and repeat test until no leaks are observed.

### 3.07 Cleaning and Protection

- A. **Cleaning:** Clean spillage and soiling from adjacent surfaces using appropriate cleaning agents and procedures.
- B. **Protection:** Take measures to protect installed product and finished surfaces from damage after application.

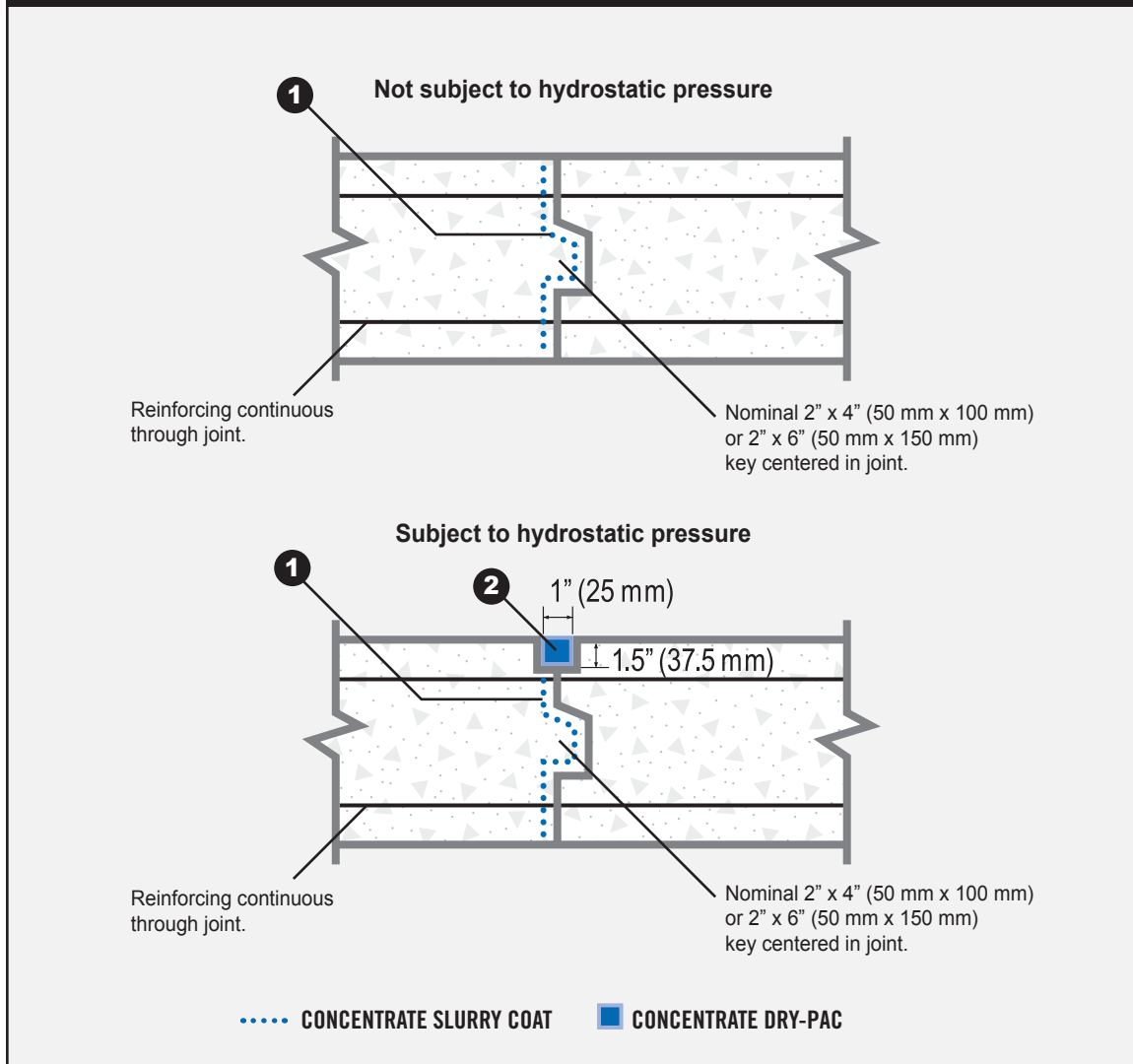
END OF SECTION 07160



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# STANDARD CONSTRUCTION JOINT DETAILS



## Walls & Slabs

**Step 1** **Joint Waterproofing:** Clean joint thoroughly. Between pours, apply Xypex Concentrate slurry to joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).

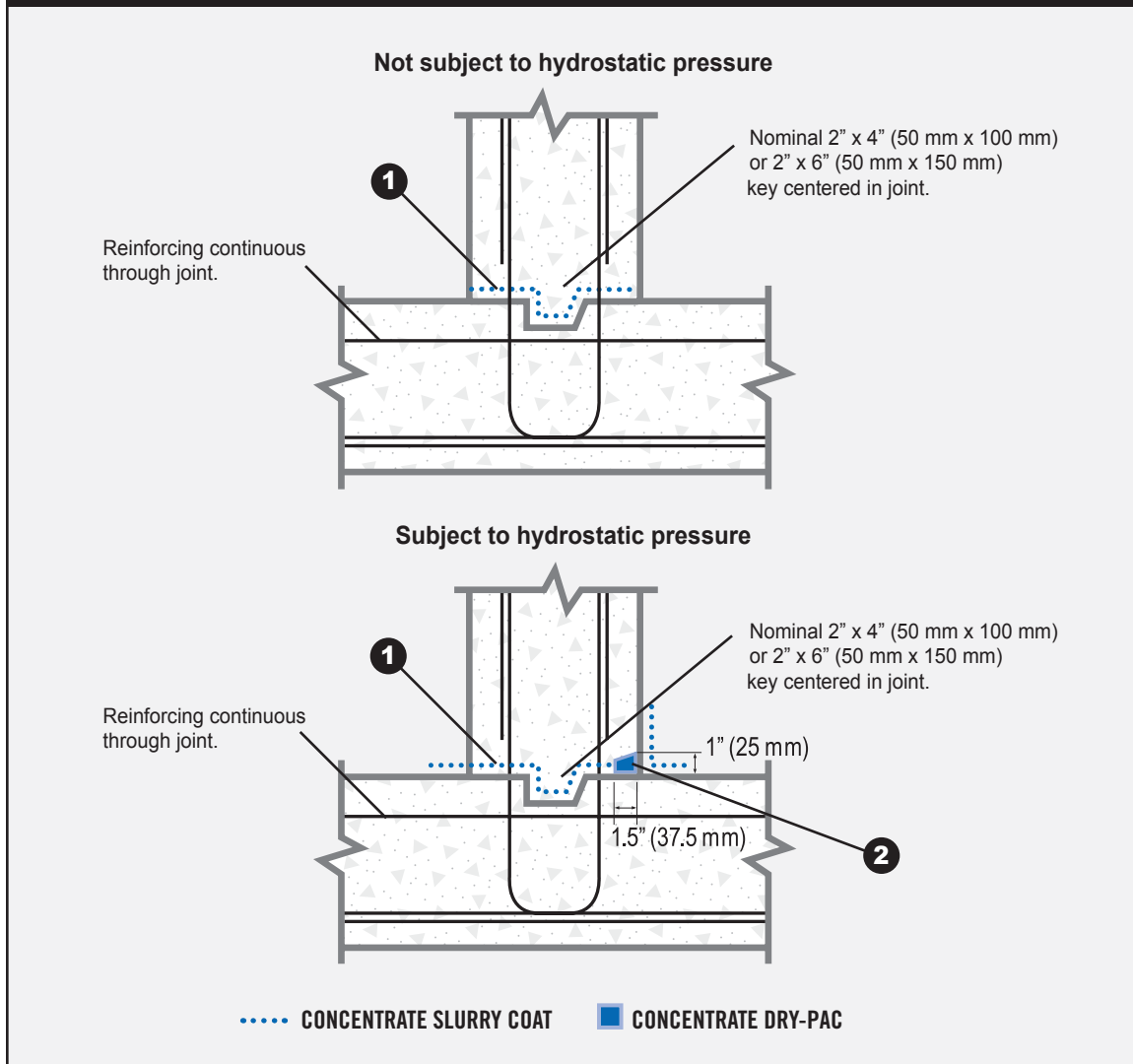
**Step 2** **Sealing Strip:** Clean pre-formed groove thoroughly. Apply Xypex Concentrate slurry to groove at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>). Fill groove with Xypex Concentrate Dry-Pac and pack tightly. Pre-formed groove may be offset to either side of joint.

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.



## STANDARD CONSTRUCTION JOINT DETAILS



### Walls / Slab Interface

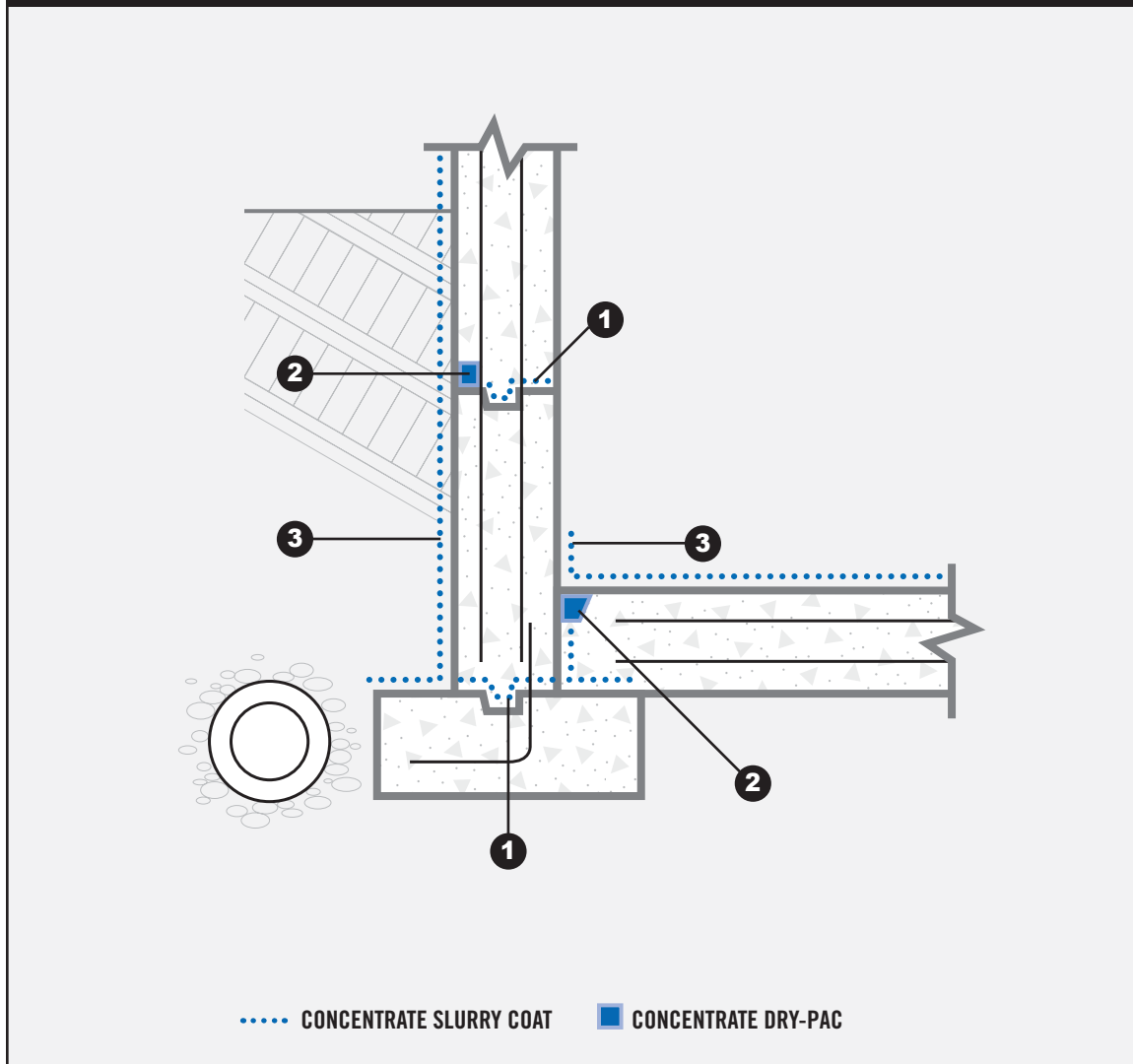
**Step 1** **Joint Waterproofing:** Clean joint thoroughly. Between pours, apply Xypex Concentrate slurry to joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).

**Step 2** **Sealing Strip:** Clean pre-formed groove thoroughly. Apply Xypex Concentrate slurry to groove at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>). Fill groove with Xypex Concentrate Dry-Pac and pack tightly. Pre-formed groove may be offset to either side of joint.

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

**CONCRETE WALL AND SLAB – BELOW GRADE**



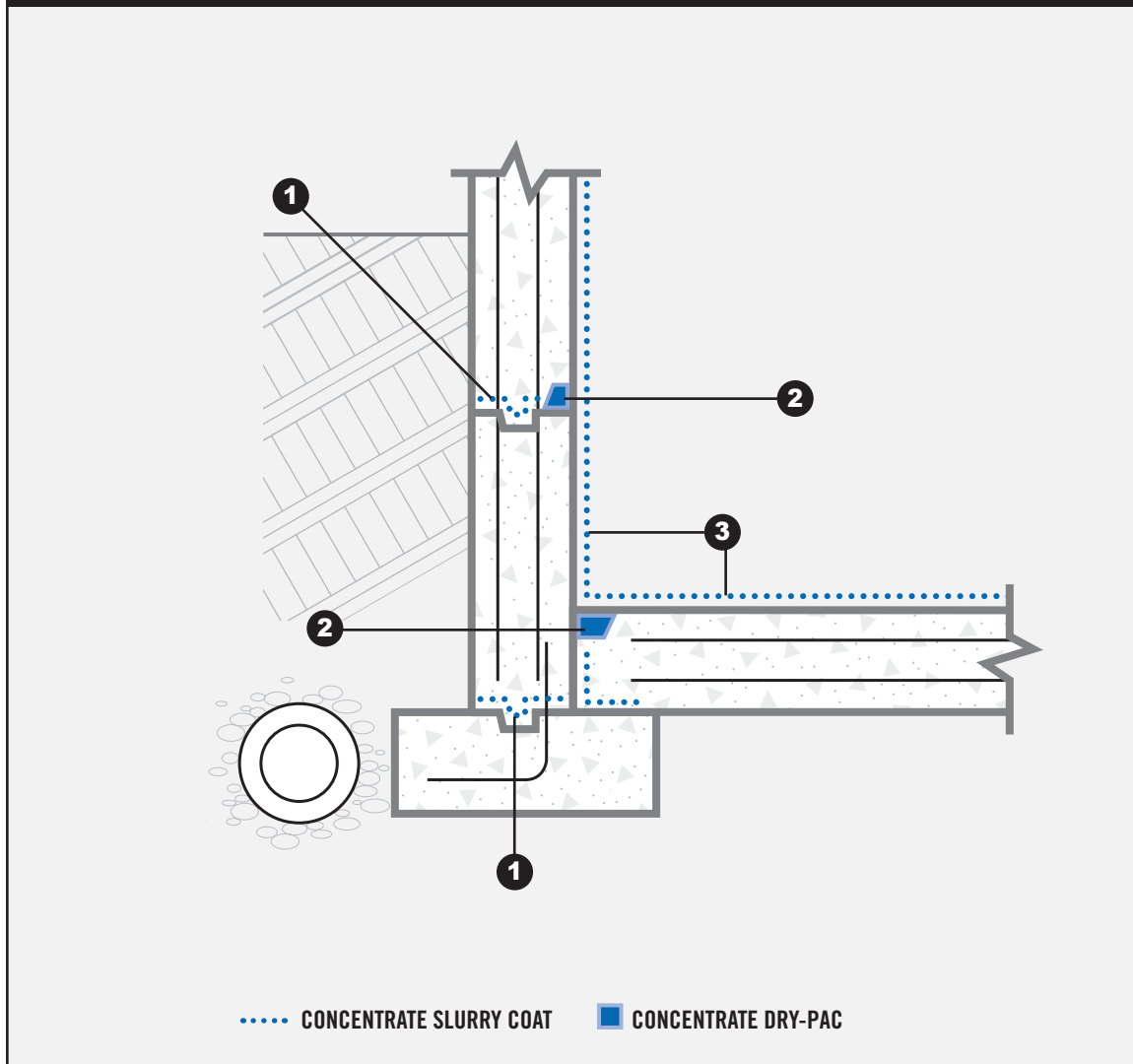
- Step 1** Between pours, apply Xypex Concentrate slurry to joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** Apply one coat of Xypex Concentrate to wall and slab surfaces as indicated at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).

Where poor drainage conditions exist or high hydrostatic pressures are anticipated, also apply a coat of Xypex Modified to wall and slab surfaces at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

**FOUNDATION WALL – INSIDE APPLICATION**



**Step 1** Between pours, apply Xypex Concentrate slurry to joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).

**Step 2** In sealing strip, apply one slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.

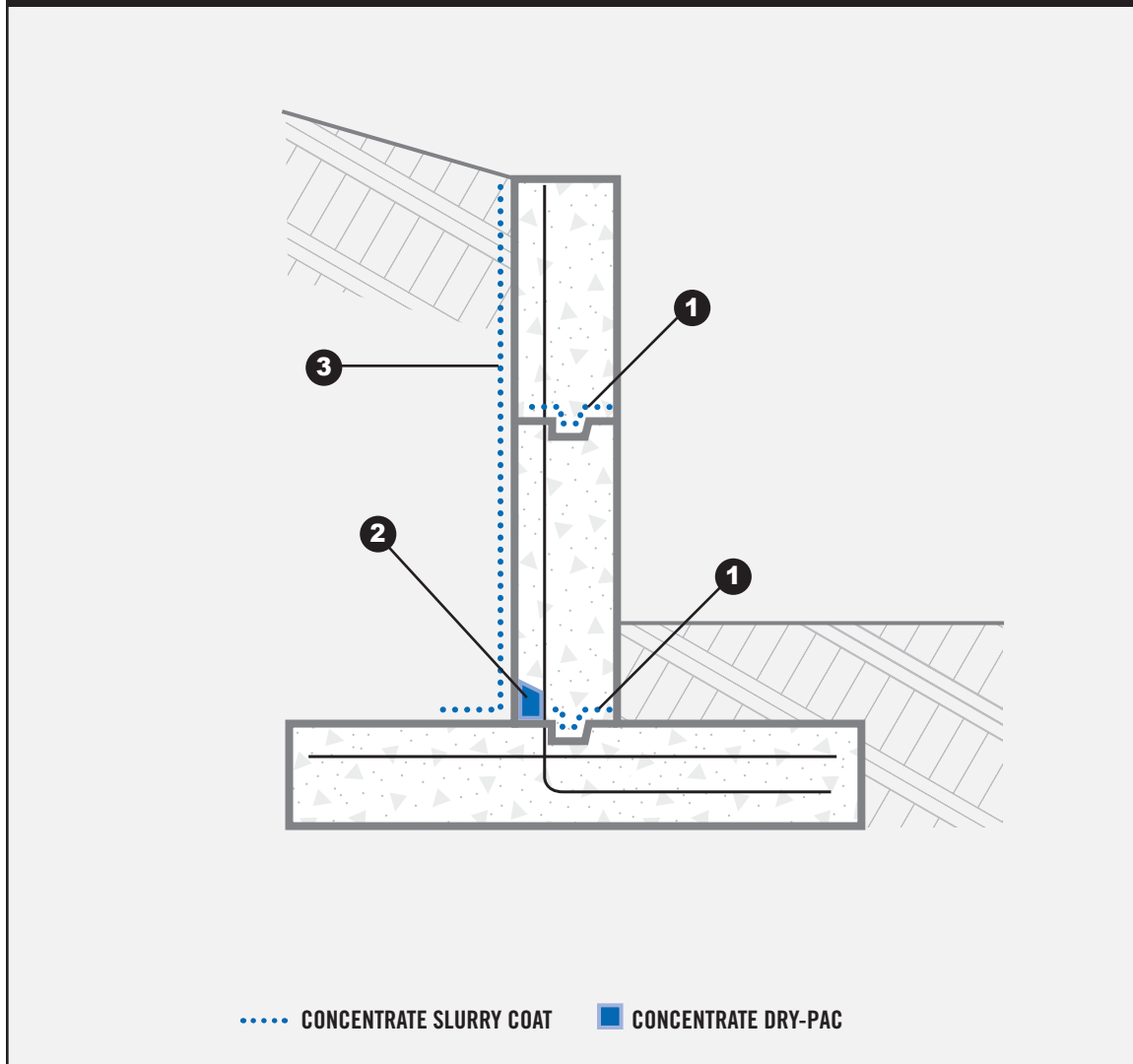
**Step 3** Apply one slurry coat of Xypex Concentrate to wall and slab surfaces as indicated at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).

Where poor drainage conditions exist or high hydrostatic pressures are anticipated, also apply a coat of Xypex Modified to wall and slab surfaces at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

**RETAINING WALL**

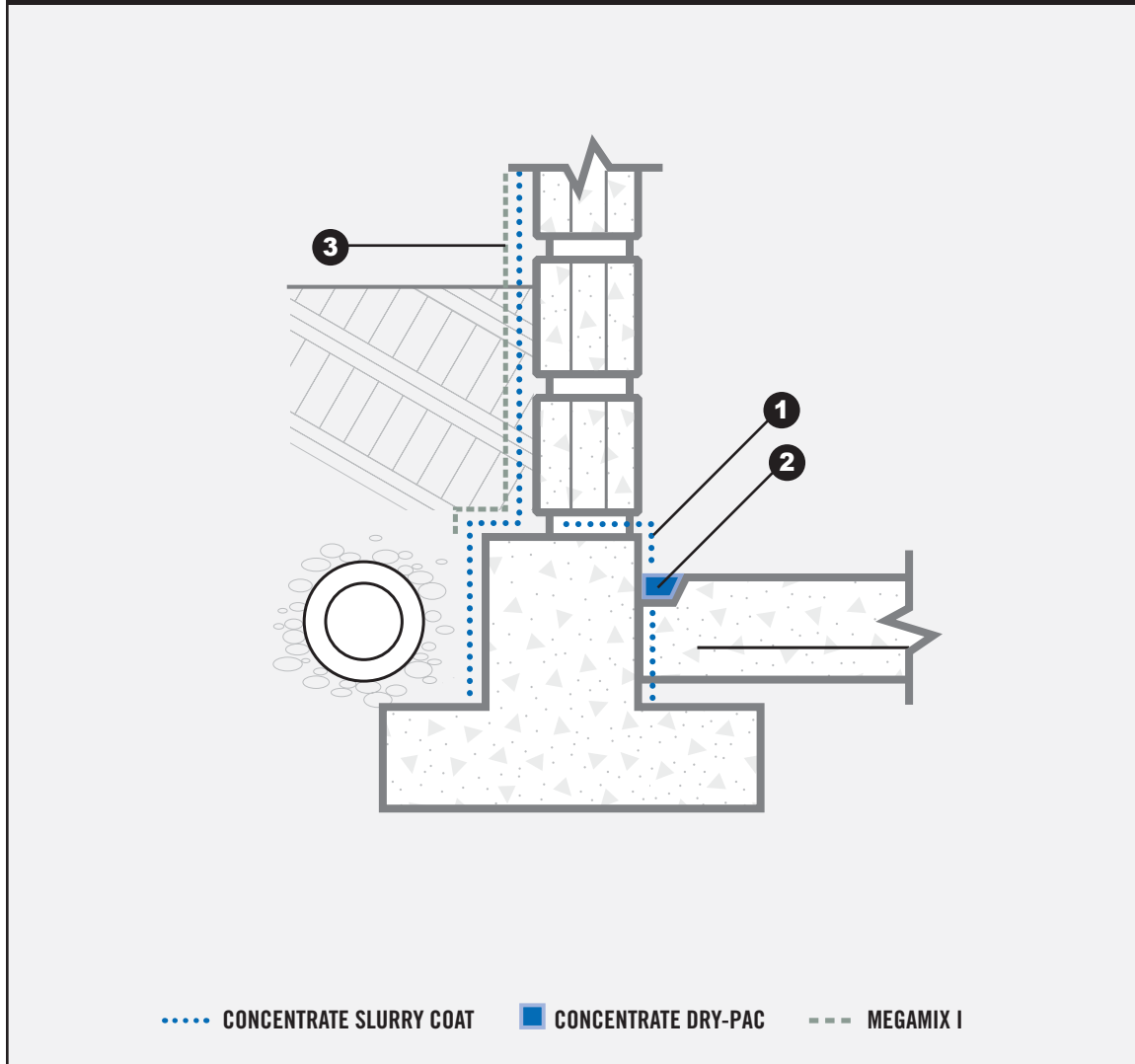


- Step 1** Between pours, apply Xypex Concentrate slurry to joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** Apply one coat of Xypex Concentrate to wall face and over sealing strip at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

**CONCRETE BLOCK WALL – BELOW GRADE – EXTERIOR APPLICATION**



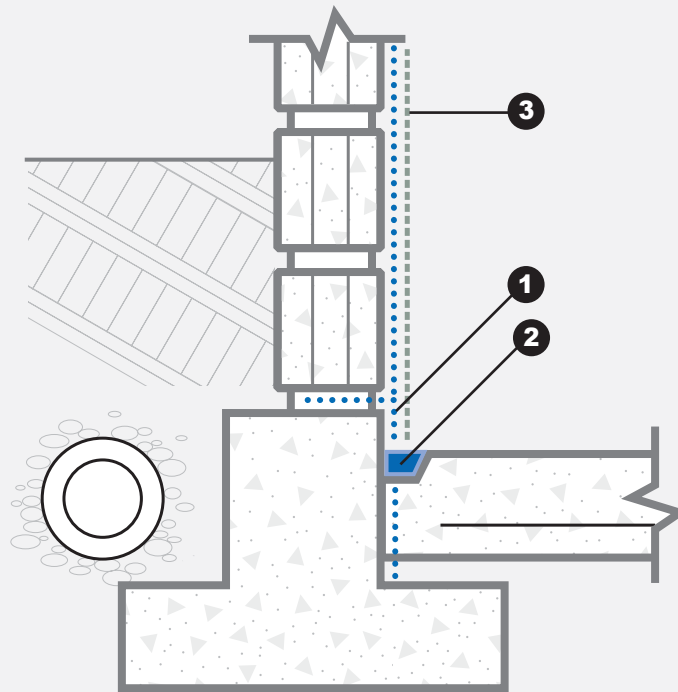
- Step 1** Prior to placement of the concrete wall and slab, apply one slurry coat of Xypex Concentrate to joint surfaces at the rate of 2 lb./sq. yd. (1 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one slurry coat of Xypex Concentrate at the rate of 1.5 lb/sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To exterior wall surface and footing apply one coat of Xypex Concentrate at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>). After the Concentrate has set but while it is still “green”, apply a coat of Xypex Megamix I at the rate of 11.25 lb./sq. yd. (5.5 kg/m<sup>2</sup>).

**Note:** Because of the variances in the quality of concrete block (e.g. cement, content, porosity, etc.), please consult your Xypex technical representative.

Schematic diagram shows Xypex coatings application only and does not depict the standard requirements for waterstops, expansion joint sealants, or pointing repairs that may be required.

Refer to Standard Specifications for further information.

# CONCRETE BLOCK WALL – BELOW GRADE – INSIDE APPLICATION



..... CONCENTRATE SLURRY COAT    ■ CONCENTRATE DRY-PAC    --- MEGAMIX I

- Step 1** Prior to placement of the concrete wall and slab, apply one slurry coat of Xypex Concentrate to joint surfaces at the rate of 2 lb./sq. yd. (1 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To inside wall surface apply one coat of Xypex Concentrate at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>). After the Concentrate has set but while it is still “green”, apply a coat of Xypex Megamix I at the rate of 11.25 lb./sq. yd. (5.5 kg/m<sup>2</sup>).

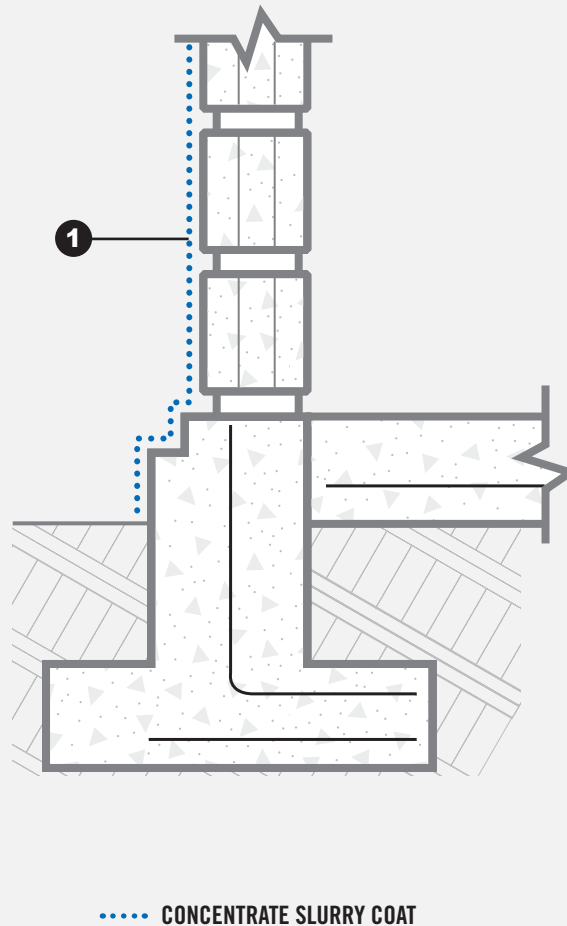
**Note:** Because of the variances in the quality of concrete block (e.g. cement, content, porosity, etc.), please consult your Xypex technical representative.

Schematic diagram shows Xypex coatings application only and does not depict the standard requirements for waterstops, expansion joint sealants, or pointing repairs that may be required.

Refer to Standard Specifications for further information.



**CONCRETE BLOCK WALL – ABOVE GRADE – EXTERIOR APPLICATION**



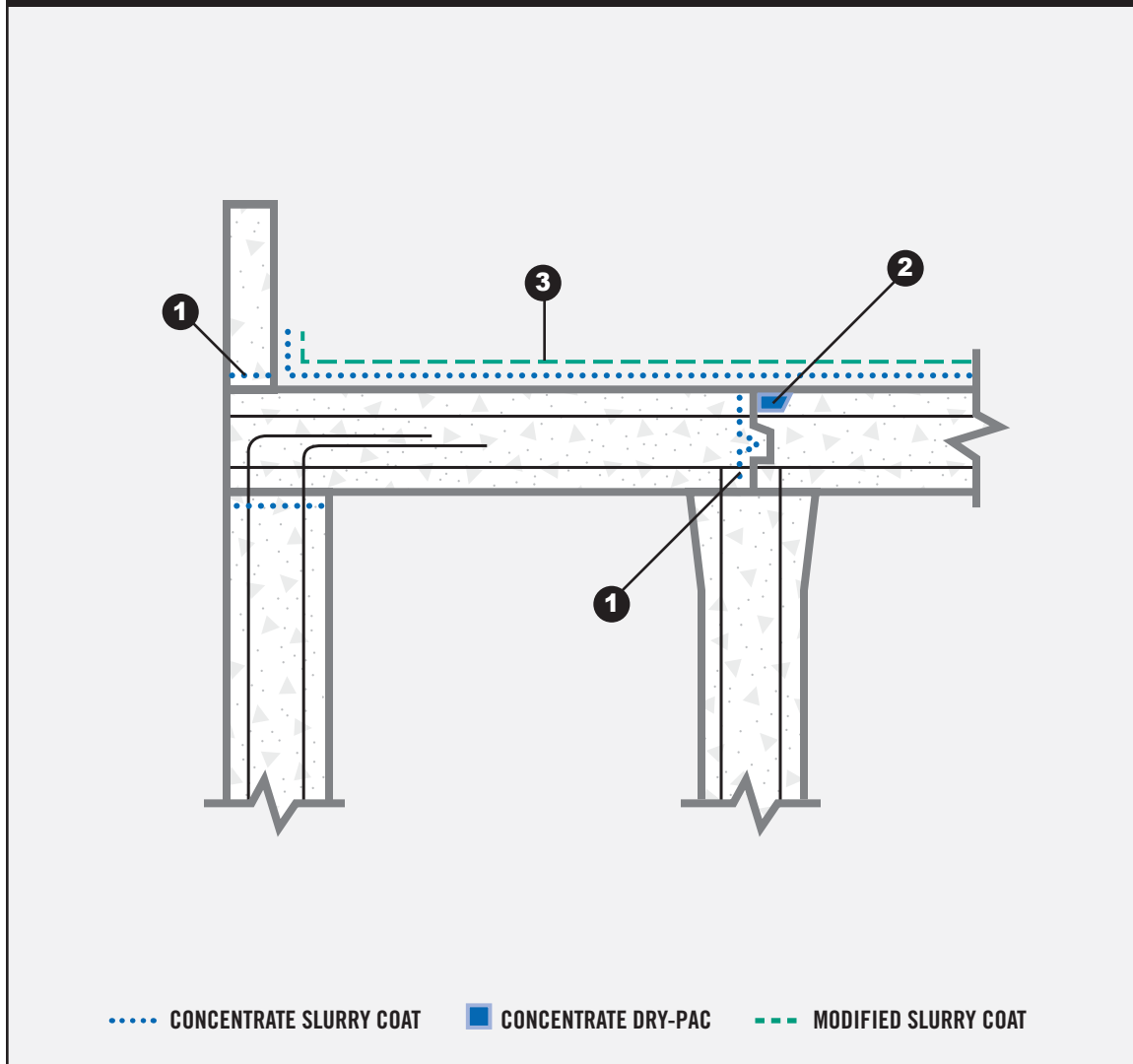
**Step 1** Apply one slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>). Coating should extend to ground level. Where poor quality block is encountered, a second coat of Xypex Concentrate should be applied at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

Wall sections should be defined before application and each of these sections should be completed during the same day to obtain maximum uniformity in appearance.

Because of the variances in the quality of concrete block (e.g. cement content, porosity, etc.), please consult your Xypex technical representative.

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

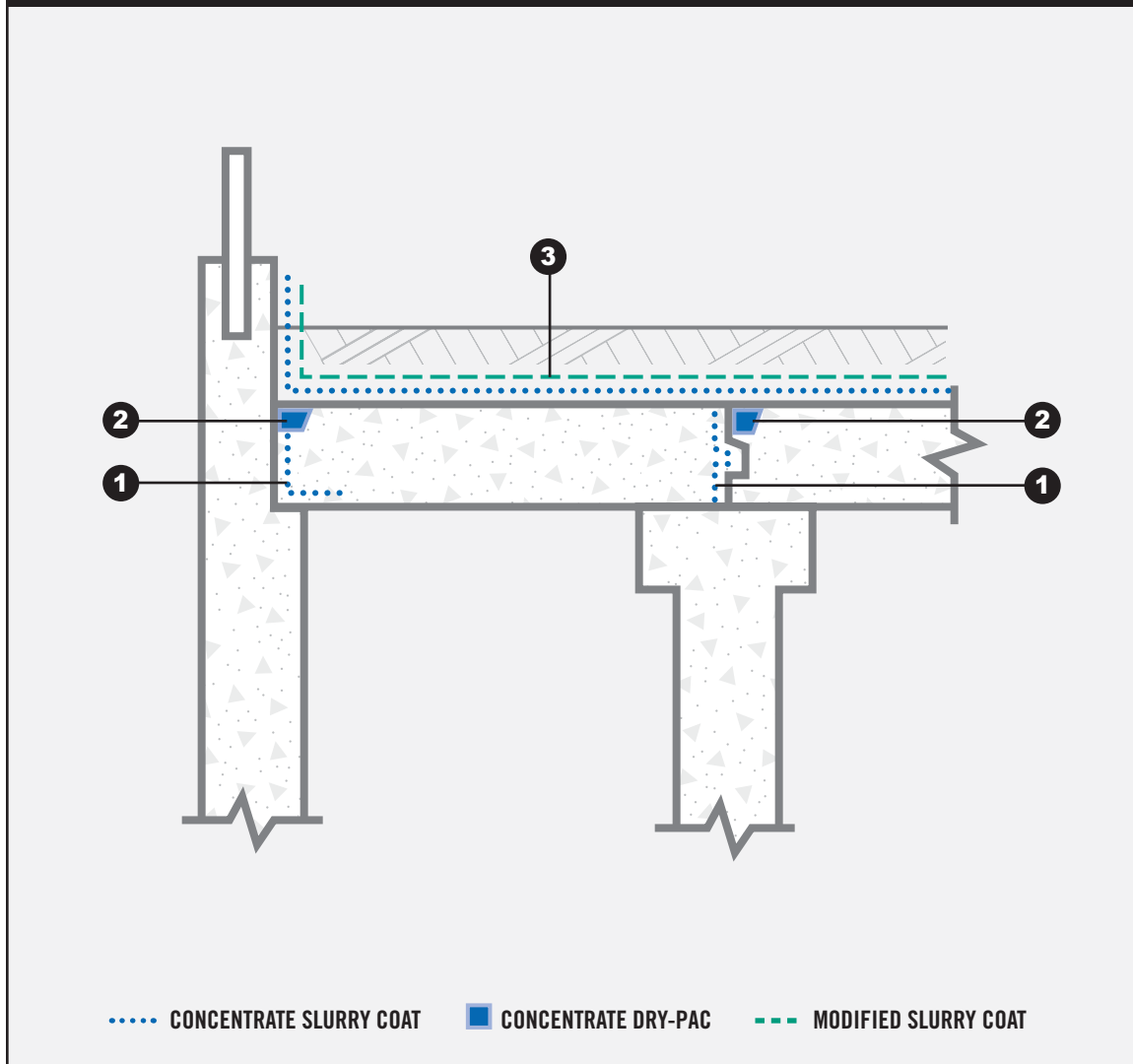
**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series), Xypex Additive (Admix C-Series) or Xypex Megamix I, where applicable. Refer to Standard Specifications for more information.



- Step 1** Between pours, apply Xypex Concentrate slurry to all joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To slab, apply one coat of Xypex Concentrate at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). After the Concentrate has set but while it is still "green", apply a coat of Xypex Modified at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.



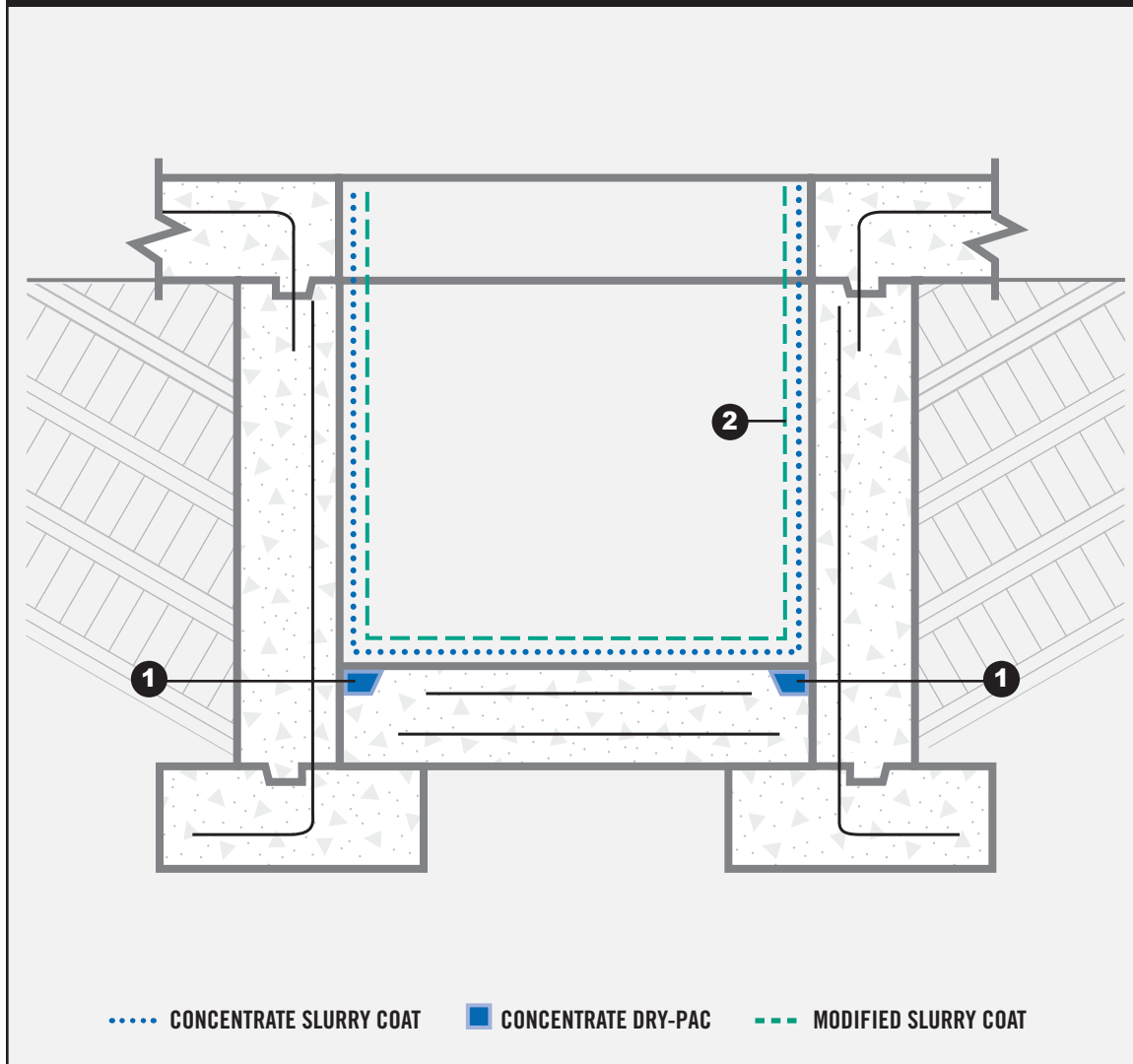
- Step 1** Between pours, apply Xypex Concentrate slurry to all joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To slab and adjacent curb wall apply one coat of Xypex Concentrate at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). After the Concentrate has set but while it is still "green", apply a coat of Xypex Modified at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

Use appropriate material for protection against sudden thermal changes.

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

ELEVATOR PIT / SUMP PIT



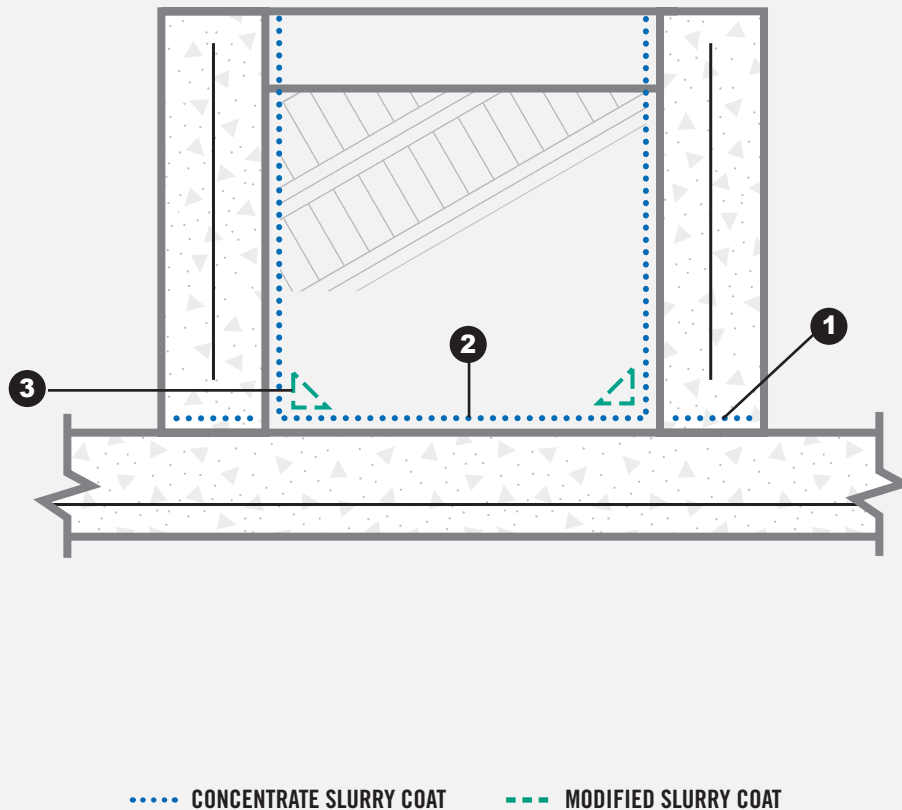
**Step 1** In sealing strip, apply one coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.

**Step 2** Apply one slurry coat of Xypex Concentrate to walls and floor slab at a rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). After the Concentrate has set but while it is still “green”, apply a coat of Xypex Modified at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

For hydraulic elevators, please contact your Xypex representative for detail drawings.

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

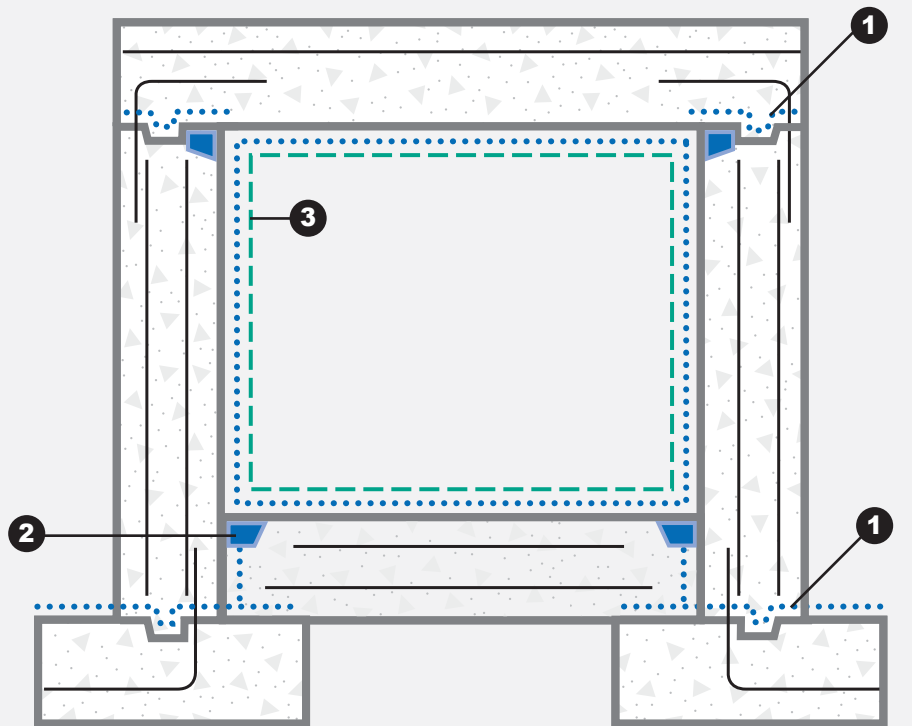
**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.



- Step 1** Between pours, apply Xypex Concentrate slurry to all joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** Apply one slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) to all interior wall and floor surfaces.
- Step 3** After slurry coat has set but while it is still “green”, apply a cove strip of Xypex Modified mortar over interior slab/wall construction joint.

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.



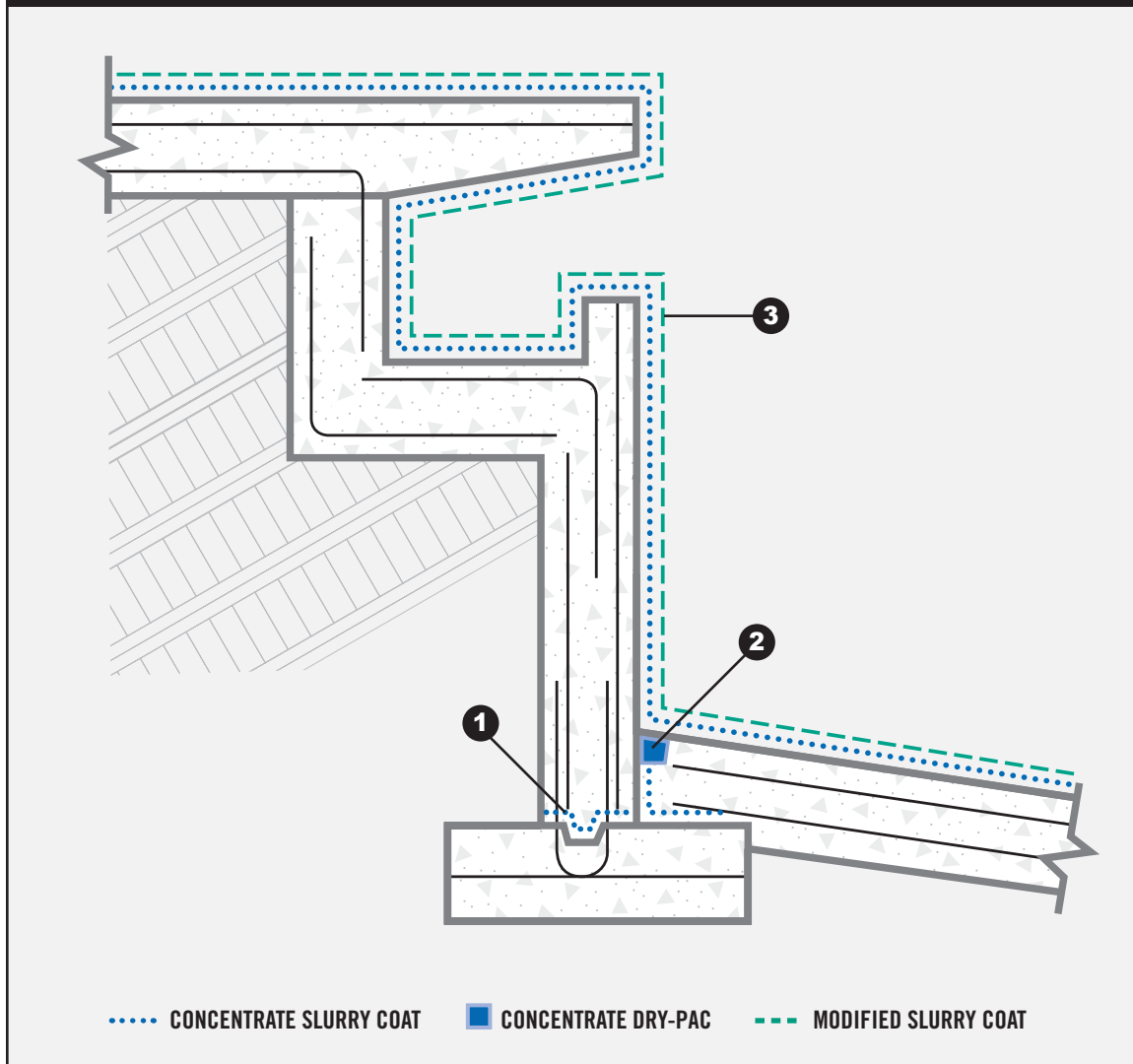
..... CONCENTRATE SLURRY COAT    ■ CONCENTRATE DRY-PAC    --- MODIFIED SLURRY COAT

- Step 1** Between pours, apply Xypex Concentrate slurry to all joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To all ceiling, wall, and floor surfaces, apply one slurry coat of Xypex Concentrate at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). After the Concentrate has set but while it is still "green", apply a coat of Xypex Modified at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.



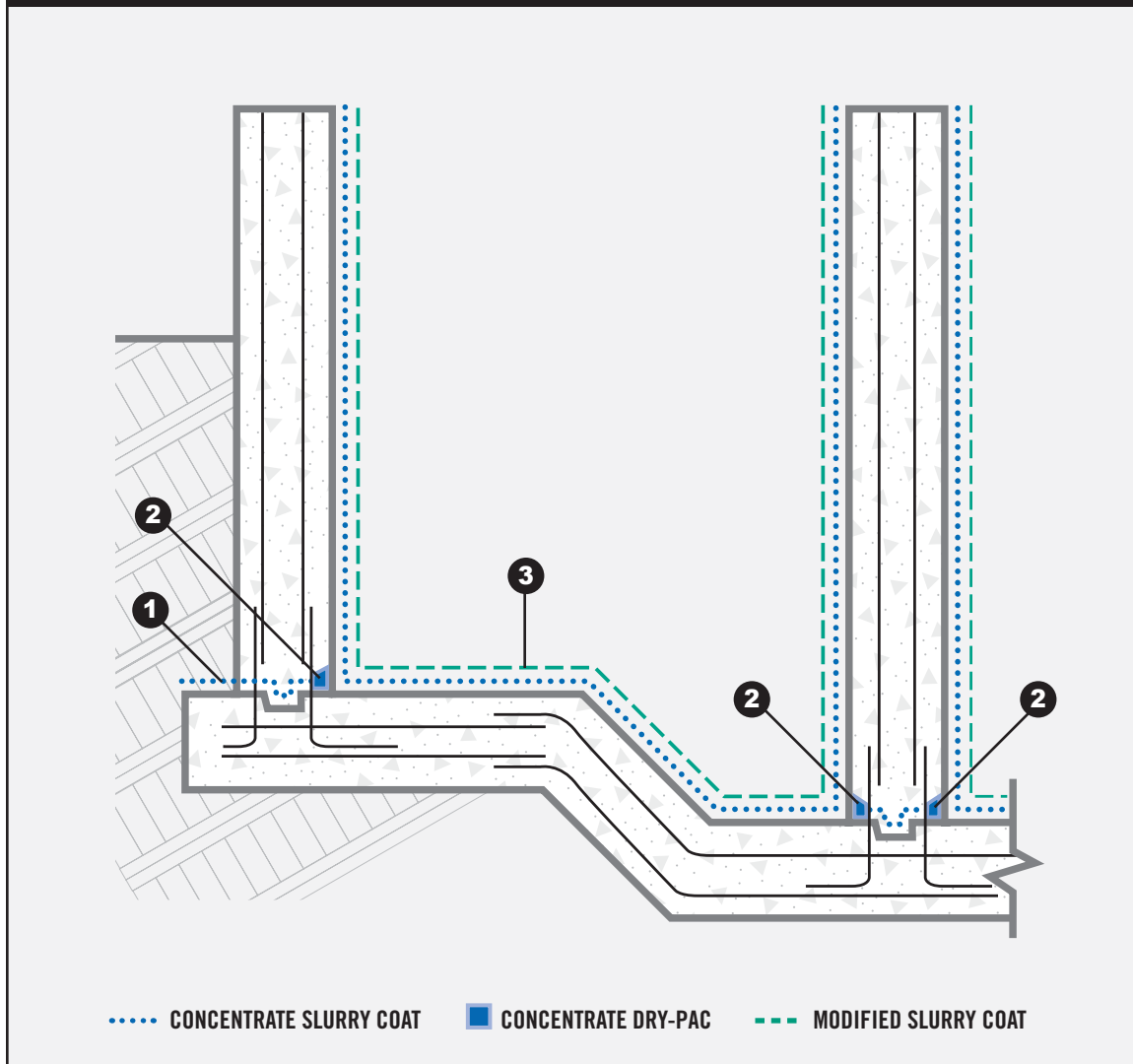


- Step 1** Between pours, apply Xypex Concentrate slurry to all joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To pool deck and all interior wall and floor surfaces, apply one slurry coat of Xypex Concentrate at a rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). After the Concentrate has set but while it is still “green”, apply a coat of Xypex Modified at a rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). In new construction, Xypex Concentrate DS-1 or Xypex Admix is recommended for pool deck and floor surfaces. Please refer to product data sheets.

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

# SEWAGE PLANT CLARIFIER TANK

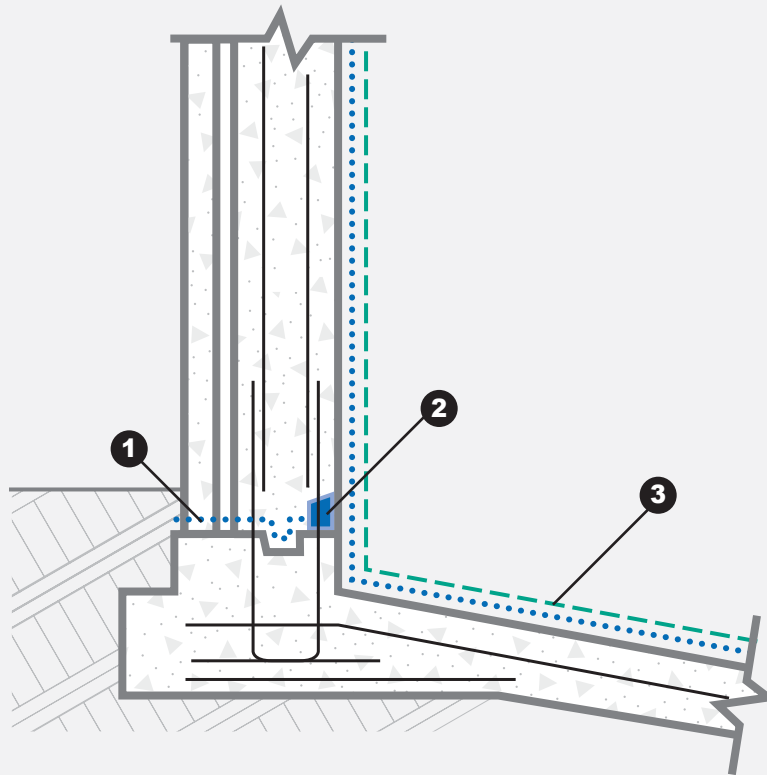


- Step 1** Between pours, apply Xypex Concentrate slurry to all joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To all ceiling, wall, and floor surfaces, apply one slurry coat of Xypex Concentrate at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). After the Concentrate has set, but while it is still "green", apply a coat of Xypex Modified at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

**SEWAGE PLANT DIGESTER TANK**



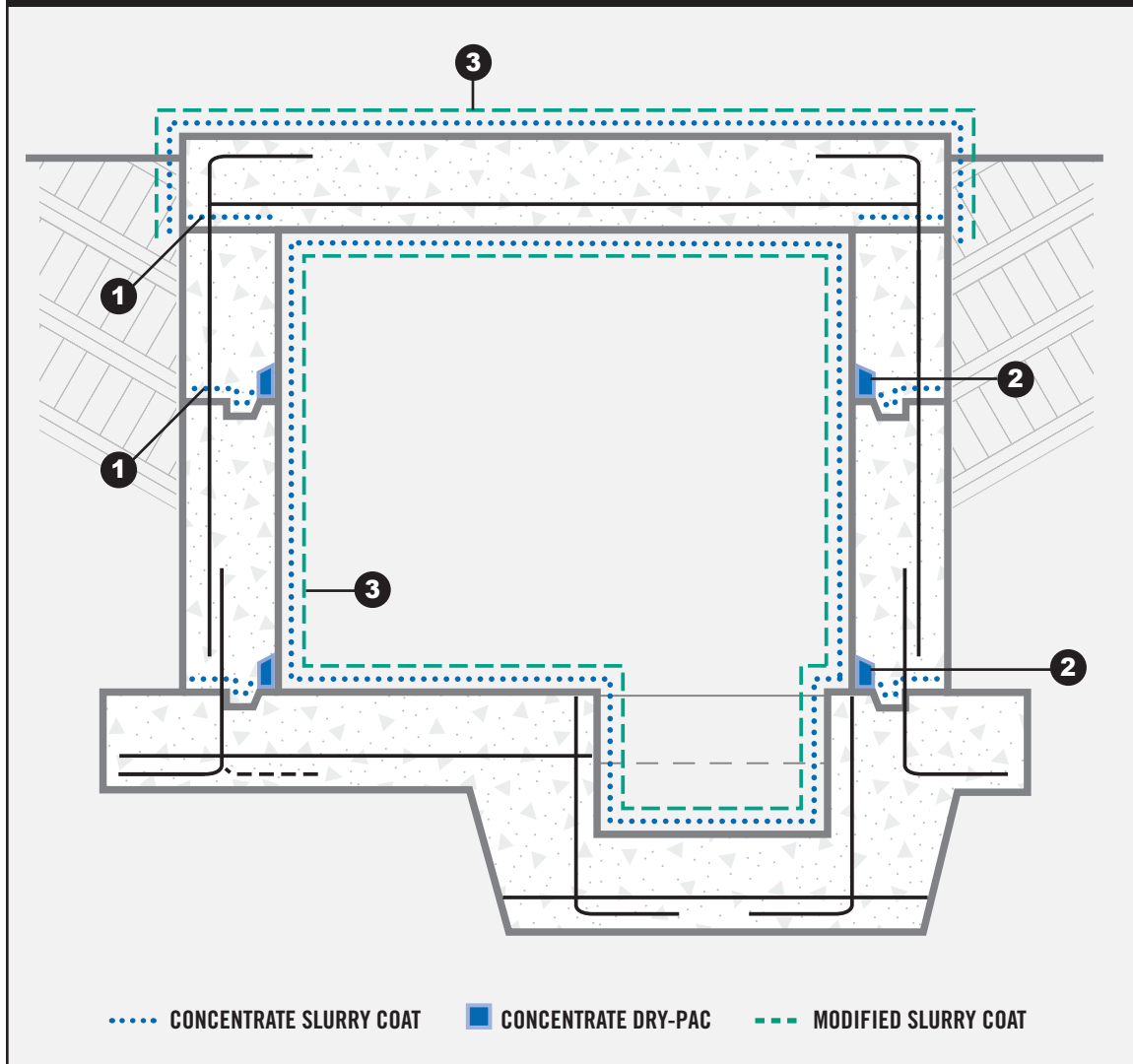
..... CONCENTRATE SLURRY COAT    ■ CONCENTRATE DRY-PAC    --- MODIFIED SLURRY COAT

- Step 1** Between pours, apply Xypex Concentrate slurry to all joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To all wall and slab surfaces, apply one slurry coat of Xypex Concentrate at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). After the Concentrate has set, but while it is still "green", apply a coat of Xypex Modified at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

**RESERVOIR / WET WELL**

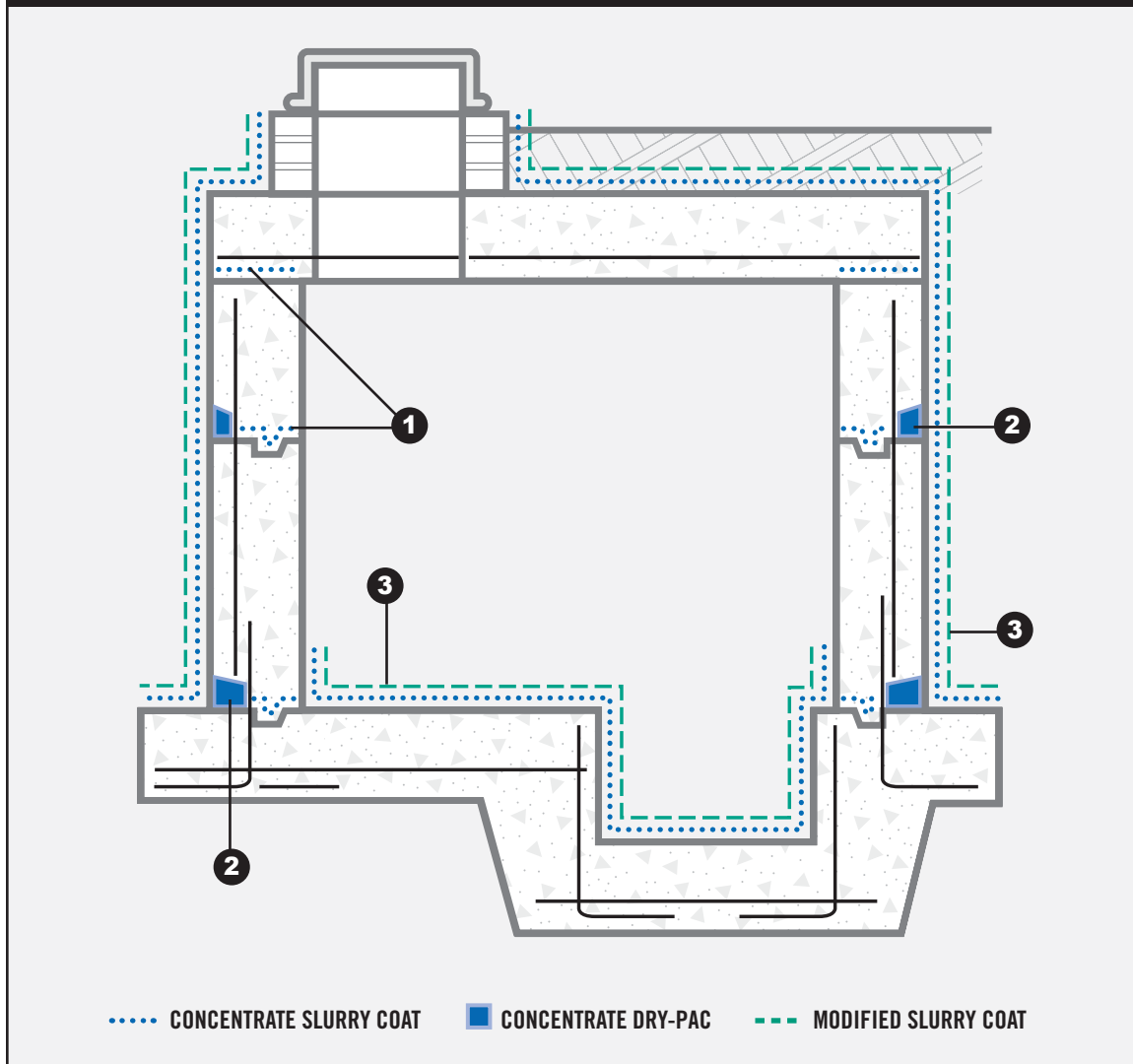


- Step 1** Between pours, apply Xypex Concentrate slurry to all joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To interior walls, slab and exterior of roof area, apply one slurry coat of Xypex Concentrate at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). After the Concentrate has set, but while it is still "green", apply a coat of Xypex Modified at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

**UNDERGROUND VAULT / DRY WELL**

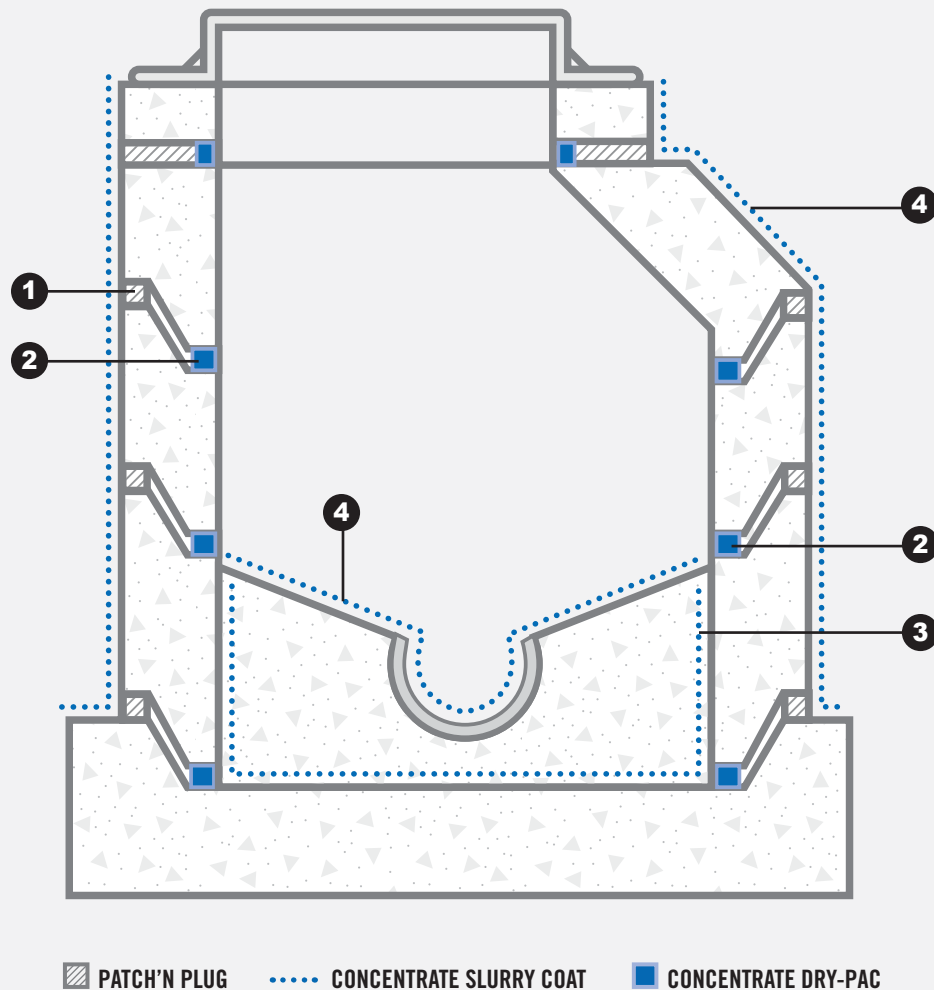


- Step 1** Between pours, apply Xypex Concentrate slurry to all joint surfaces at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>).
- Step 2** In sealing strip, apply one coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill slot to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** To interior floor areas and exterior walls and roof, apply one slurry coat of Xypex Concentrate at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>). After the Concentrate has set, but while it is still "green", apply a coat of Xypex Modified at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

**PRECAST CONCRETE MANHOLE**



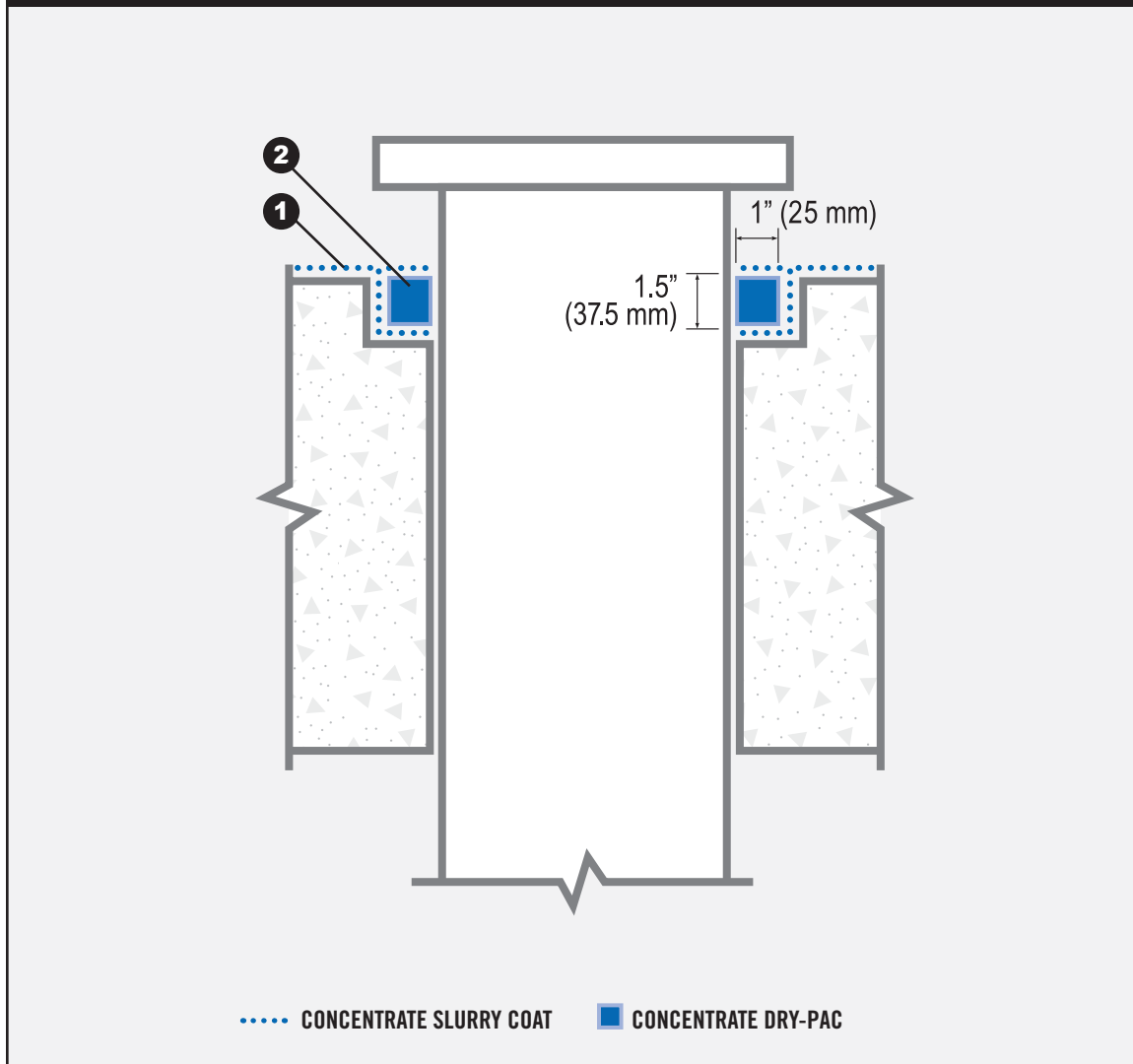
- Step 1** Place block in joints to allow 0.5 - 0.75 in. (13 - 19 mm) gap between precast sections. Fill exterior gap with Xypex Patch'n Plug grout.
- Step 2** Apply one slurry coat of Xypex Concentrate to the interior gap at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>), then fill gap to surface with Xypex Concentrate in Dry-Pac form.
- Step 3** Apply one slurry coat of Xypex Concentrate to interior of bottom ring, floor and exterior walls at the rate of 1.25 - 1.5 lb./sq. yd. (0.65 - 0.8 kg/m<sup>2</sup>).
- Step 4** After placement of concrete trough, apply one slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>) to its surface.

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.



**STANDARD METAL PIPE DETAIL**



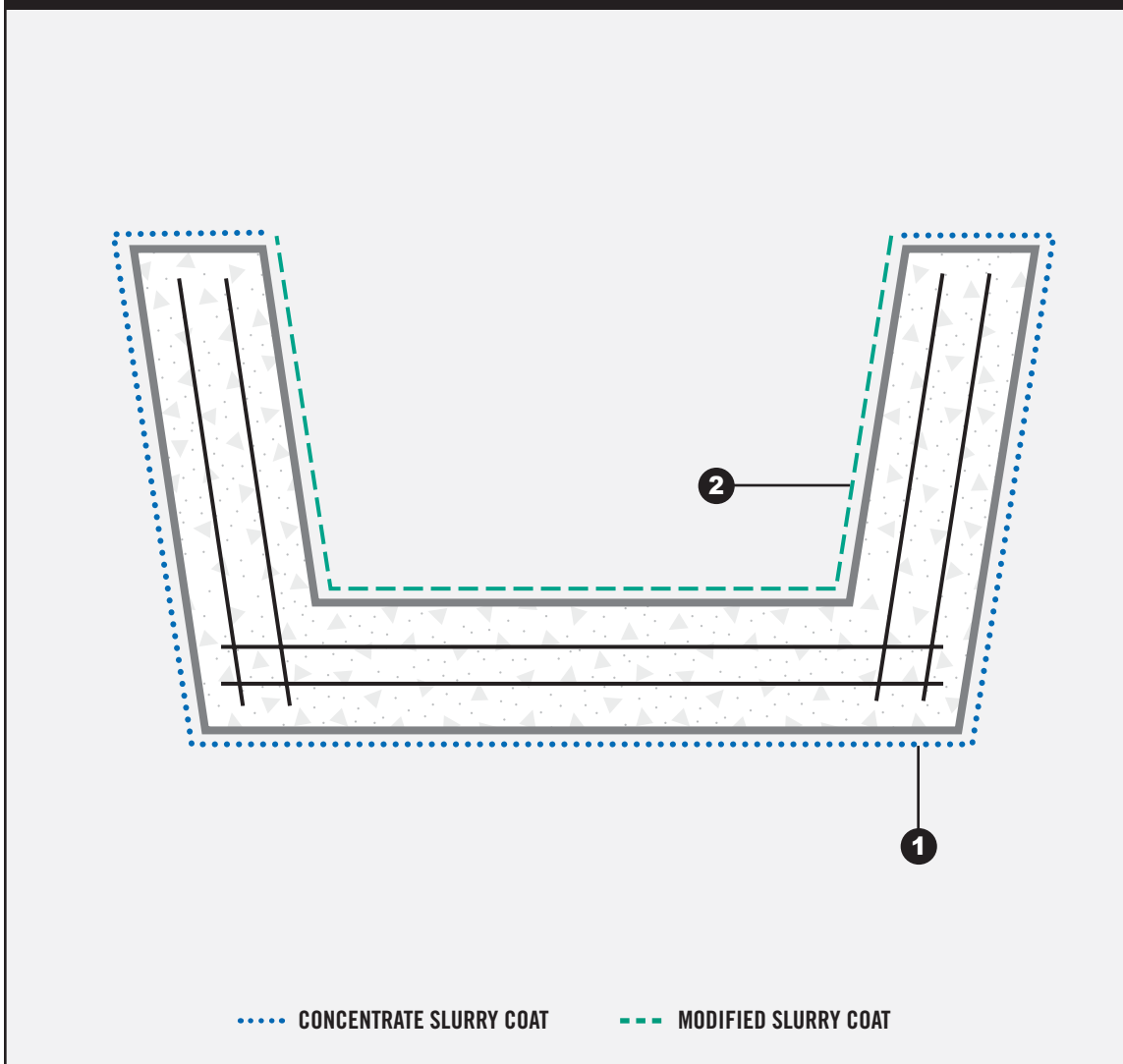
**Step 1** Apply Xypex Concentrate slurry to the groove at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).

**Step 2** Fill groove to surface with Xypex Concentrate in Dry-Pac form and pack tightly. Brush Dry-Pac liberally with water and apply a Xypex Concentrate slurry over the Dry-Pac at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.

FERRO-CEMENT BOAT / CAISSON / FLOATING DOCK



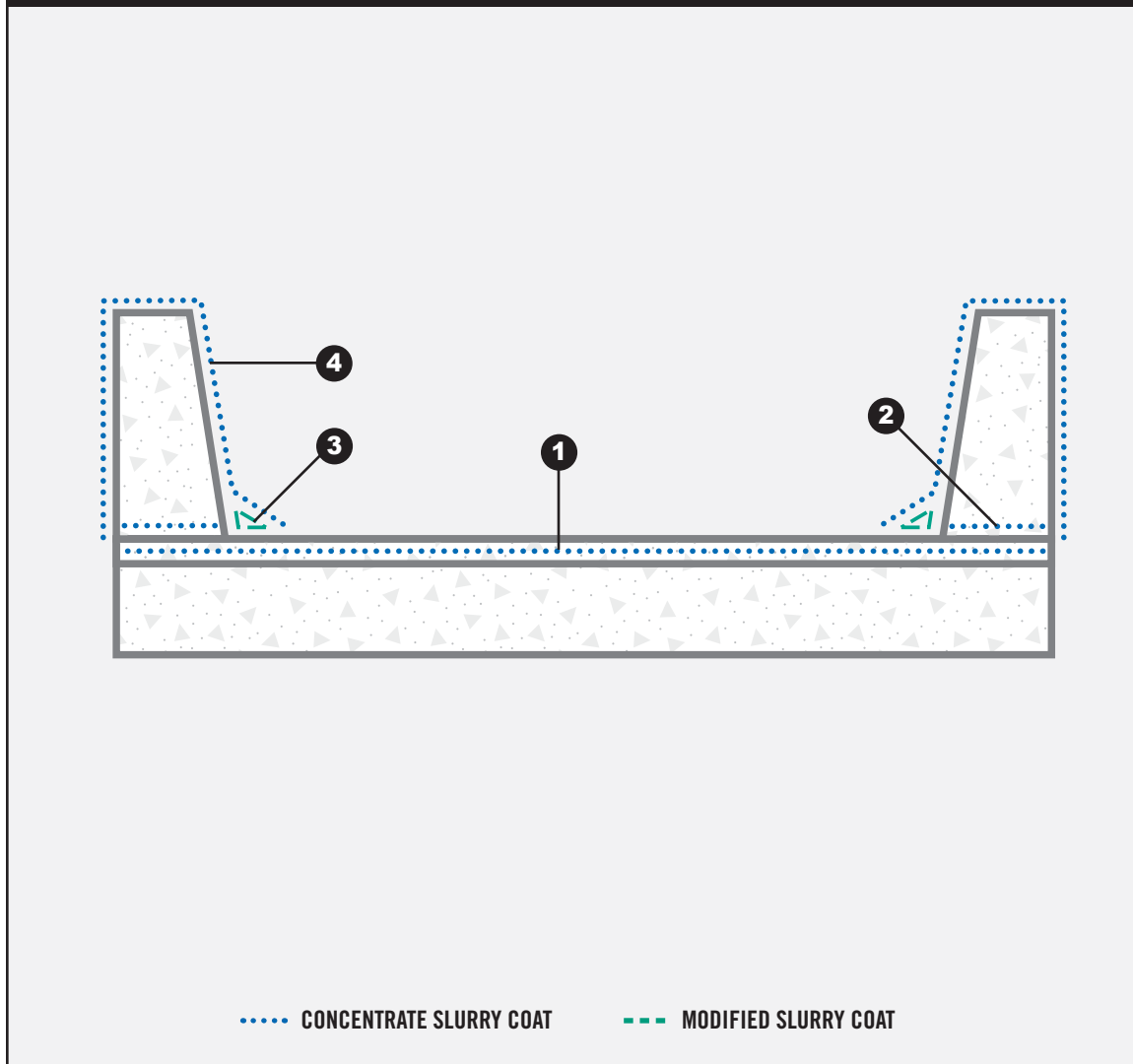
**Step 1** Apply one slurry coat of Xypex Concentrate to hull exterior, gunwhales, and all exterior decks at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).

**Step 2** Apply one coat of Xypex Modified to interior surface of hull at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).

In the case of sealed, hollow-core caissons, step 2 is eliminated and the Concentrate slurry coat in step 1 should extend over entire exterior of unit.

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.



- Step 1** Apply one slurry coat of Xypex Concentrate to structural slab at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).
- Step 2** Apply one slurry coat of Xypex Concentrate to joint surface between parapet wall and bridge deck at the rate of 2.0 lb./sq. yd. (1.0 kg/m<sup>2</sup>). Xypex must be applied no more than 24 hours prior to concrete placement.
- Step 3** Apply a cove strip of Xypex Modified mortar over slab/wall construction joint so that the cove extends 1 in. (25 mm) up the wall and 1 in. (25 mm) out on to the deck surface.
- Step 4** Apply one slurry coat of Xypex Concentrate to wall surfaces at the rate of 1.5 lb./sq. yd. (0.8 kg/m<sup>2</sup>).

**Note 1:** Schematic diagram shows Xypex application details only and does not depict standard requirements for waterstops or expansion joint sealants.

**Note 2:** Schematic drawing shows Xypex Coating application. Specifier may consider the alternative use of Xypex Dry Shake (DS-Series) or Xypex Additive (Admix C-Series), where applicable. Refer to Standard Specifications for more information.







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## TESTS & APPROVALS

Test Report Summaries • Approvals









## Allentown Testing Laboratories, Inc.

USA

**“Certificate of Test and Analysis”, Allentown Testing Laboratories, Inc, Pennsylvania, USA**



## Amtliche Materialprüfanstalt

Germany

**“Testing of Xypex Concentrate with Regard to Water Impermeability (Negative Test)”, DIN 1048, Amtliche Materialprüfanstalt, Clausthal-Zellerfeld, Germany**

Amtliche  
Materialprüfanstalt



## Armabeton a.s.

Czech Republic

**“Evaluation of Increase in Strength for Concrete B20 with an Additive of Xypex Admix C-2000”, ČSN 73 1317, Armabeton a.s., Praha, Czech Republic**





## Australian Centre for Construction Innovation

Australia

**“Microscopic Examination of Crystalline Products in Three Xypex Admix Modified Concretes and Mortar”,** Scanning Electron Microscopy (SEM), Australian Centre for Construction Innovation (ACCI), University of New South Wales, Sydney, NSW, Australia



## Aviles Engineering Corporation

USA

**“Effects of Sulfuric Acid on Concrete Samples”,** Aviles Engineering Corporation, Houston, Texas, USA

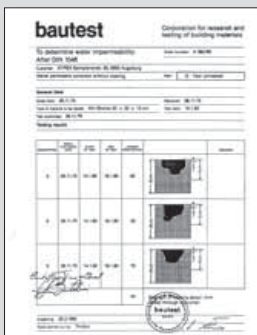


## Aviles Engineering Corporation

USA

**“Permeability Test on Treated and Untreated Concrete Samples”,** Army Corps of Engineers CRD C48-73, Aviles Engineering Corporation, Houston, Texas, USA





## Bautest Corporation

Germany

**“To Determine Water Impermeability”, DIN 1048,**  
Bautest Corporation, Augsburg, Germany

bautest



## BHP Steel

Australia

**“Examination of Various Concrete Microstructures”,**  
Scanning Electron Microscopy (SEM), Metallurgical Technology  
Department, BHP, NSW, Australia

BHP



## Building & Construction Research & Consulting

Australia

**“Microscopic Examination of Samples from a Concrete Reservoir Treated with Xypex Two-Coat System”,**  
Scanning Electron Microscopy (SEM), BRC (NSW) Pty Ltd,  
Building & Construction Research & Consulting, Brookvale,  
NSW, Australia

BRC



## Building Materials Test Center

Japan

**“Performance Test (Freeze-Thaw) of the Concrete Coated with Waterproofing Agent”, JIS A 6204, Building Materials Test Center, Tokyo, Japan**



## Central Construction Laboratory

Russia

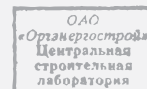
**“To Evaluate the Water Tightness of Samples of Concrete with Xypex Coating”, GOST 12730.5, Central Construction Laboratory, Public Corporation “Orgenergostroi”, Moscow, Russia**

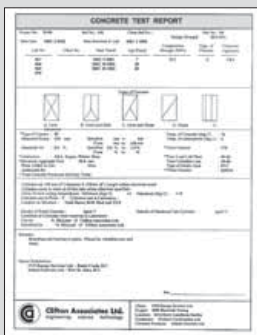


## Central Construction Laboratory

Russia

**“Test of the Materials Xypex Concentrate and Xypex Patch’n Plug”, GOST 12730.5-84, Central Construction Laboratory, Public Corporation “Orgenergostroi”, Moscow, Russia**





### Clifton Associates Ltd.

Canada

**“Compressive Strength of Cylindrical Concrete Specimens”,**  
Clifton Associates Ltd., Fort St. John, BC, Canada

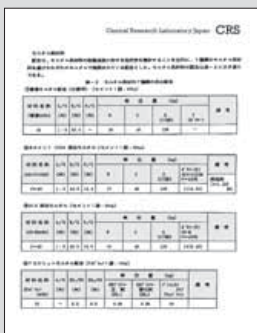


### Construction Bureau of Chubu District

Japan

**“Repairing of Heavily Cracked Reinforced Concrete Bridge Deck Slab from Underside”,** Construction Bureau of Chubu District, The Ministry of Construction, Aichi Institute of Technology, Japan

MOC



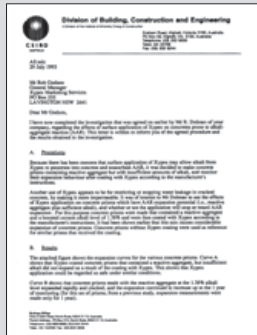
### C.R.S. Ltd.

Japan

**“Acid-Proofed Concrete Test Report”,** Japan Industrial Standards (JIS) C.R.S. Ltd. (Central Research Laboratory), Tokyo, Japan

CRS





## CSIRO Division of Building

Australia

**“Effects of Surface Application of Xypex on Concretes Prone to Alkali-Aggregate Reaction (AAR)”**, CSIRO Division of Building, Construction and Engineering, Highett, VIC, Australia



## DICTUC S.A.

Chile

**“Impermeability to Water”**, DIN 1048, DICTUC S.A., Department of Engineering and Construction Management, Santiago, Chile



## Gradis Teo

Slovenia

**“Investigation of Xypex-Treated Concrete Resistance to Freezing and Thawing with Salt”**, JUS Standard U.M1.055, Gradis Teo, Technical, Economic and Organizational Services, d.d., Ljubljana, Slovenia





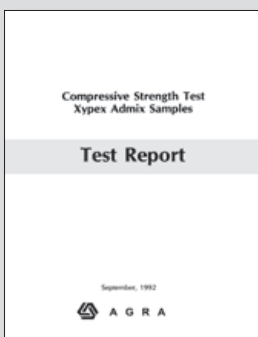
## Hardy BBT Limited

Canada

**“Evaluate Direct Tensile Bond Strength and Abrasion Resistance of Plain Concrete and Concrete Treated with Xypex DS-2”, CAN/CSA A23.2-6B, Hardy BBT Limited, Burnaby, BC, Canada**



Hardy BBT Limited



## HBT Agra Ltd.

Canada

**“Compressive Strength Test – Xypex Admix Samples”, HBT Agra Ltd, Vancouver, BC, Canada**



AGRA



## Hönnun Ltd.

Iceland

**“Activity of Xypex Concentrate & Admix in Icelandic Concrete”, U.S. Army Corps of Engineers CRD C48-73, NT Build 492 and 443, Hönnun Ltd, Consulting Engineers, Reykjavik, Iceland**

HÖNNUN



## Hosei University

Japan

**“Sealing Effectiveness of Xypex Concentrate Coating”,**  
Hosei University, Department of Technology, Tokyo, Japan

HOSEI

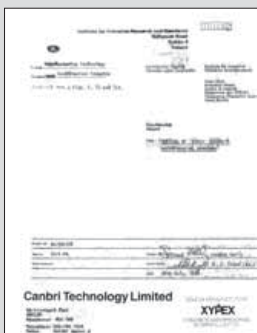


## Hosei University

Japan

**“Water Permeability Test”,** Civil Engineering Department,  
Hosei University, Tokyo, Japan

HOSEI



## Institute for Industrial Research and Standards

Ireland

**“Testing of Xypex Concrete Waterproofing Compound”,**  
Institute for Industrial Research and Standards, Dublin, Ireland

IIRS



## ITH – Instituto Tecnológico Del Hormigon S.A.

Argentina

**“Testing of a Mix of Concrete with the Inclusion of Powder Additive Xypex Admix C-2000”,** ITH – Instituto Tecnológico Del Hormigon S.A., Buenos Aires, Argentina



Instituto Tecnológico  
Del Hormigon S.A.



## Iwate University

Japan

**“Chemical Durability of Cement Crystal Increasing Agent Applied Concrete”,** Department of Civil & Environmental Engineering, Iwate University, Morioka, Japan

Iwate  
University



## Japan Atomic Energy Research Institute

Japan

**“Studies on Diffusion of <sup>137</sup>Cs in Cement Mortar”,** Japan Atomic Energy Research Institute (JAERI), Tokai-mura, Japan

日本原子力研究所  
Japan Atomic Energy Research Institute



## Kaunas Technological University

Lithuania

**“Water Permeability of Xypex-Treated Concrete”, LST 1330,**  
Laboratory of Building Materials and Constructions, Kaunas  
Technological University, Kaunas, Lithuania



## Kleinfelder

USA

**“Compressive Strength Testing of Concrete Containing Xypex Admix”, Kleinfelder, Inc, San Francisco, California, USA**



## Klokner Institute

Czech Republic

**“Tests of Impermeability and Resistance of Xypex Coating to: Silage Juices, Diesel Oil, Gasoline and Transformer Oil”, Klokner Institute, Czech University of Technology, Prague, Czech Republic**





## Klokner Institute

Czech Republic

**“Evaluation of Porosity of Concrete Treated with Xypex Coating Materials”, Klokner Institute, Czech University of Technology, Prague, Czech Republic**



## Klokner Institute

Czech Republic

**“Determination of CO<sub>2</sub> Diffusion Through Concrete Treated with a Coating of Xypex Concentrate”, Klokner Institute, Czech Technical University, Prague, Czech Republic**



## Levelton Engineering Ltd.

Canada

**“Laboratory Physical Testing – Xypex Megamix II Repair Mortar”, ASTM C109, C78, C496, C1202, C642, Levelton Engineering Ltd., Richmond, BC, Canada**

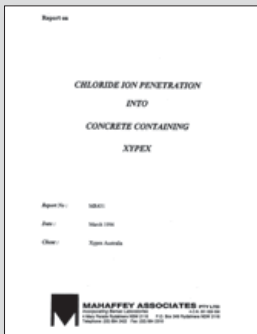






**LPM (Laboratories for Preparation & Methodology)**  
Switzerland

**“To Determine Permeability and Imperviousness”,**  
LPM (Laboratories for Preparation and Methodology),  
Beinwil am See, Switzerland



**Mahaffey Associates Pty Ltd.**  
Australia

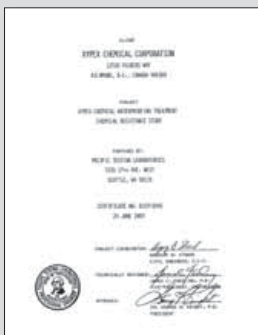
**“Chloride Ion Penetration into Concrete Containing Xypex”,**  
Mahaffey Associates Pty Ltd., Rydalmere, NSW, Australia



**Metro Testing Laboratories Ltd.**  
Canada

**“Bond Pull-Off Testing – Xypex Megamix I and Megamix II”,**  
Metro Testing Laboratories Ltd., Burnaby, BC, Canada

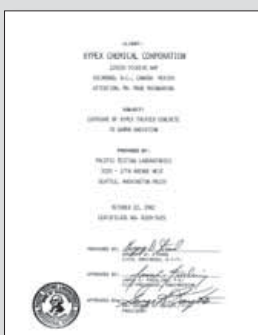




## Pacific Testing Laboratories

USA

**“Xypex Chemical Waterproofing Treatment Chemical Resistance Study”, ASTM C-267-77, Pacific Testing Laboratories, Seattle, Washington, USA**



## Pacific Testing Laboratories

USA

**“Exposure of Xypex Treated Concrete to Gamma Radiation”, USA Standard No. N6.9, Pacific Testing Laboratories, Seattle, Washington, USA**

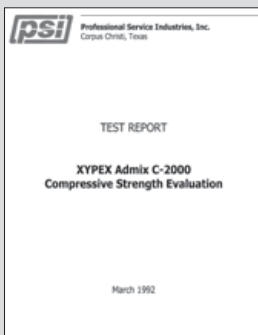


## Pacific Testing Laboratories

USA

**“Permeability Test of Treated and Untreated Concrete Samples”, U.S. Army Corps of Engineers CRD C48-73, Pacific Testing Laboratories, Seattle, Washington, USA**





## Professional Service Industries

USA

**“Xypex Admix C-2000 Compressive Strength Evaluation”,**  
ASTM 39, Professional Service Industries, Inc. (PSI),  
Corpus Christi, Texas, USA



## Setsco Services Pte Ltd.

Singapore

**“Petrographic Examination of Hardened Concrete Core”,**  
ASTM C856-88, Setsco Services Pte Ltd., Singapore



## Setsco Services Pte Ltd.

Singapore

**“Effectiveness of Xypex Products on Waterproofing**  
**Capability, Heat Reduction in Concrete, and Compressive**  
**Strength”,** CRD C48-73 (modified), SS 78, BS 1881,  
Setsco Services Pte Ltd., Singapore





**Slovak University of Technology**

Slovak Republic

**“Testing of the Effectiveness of the Coating Material Xypex to Prevent Gas Permeability of the Concrete”,**  
Slovak University of Technology, Department of Concrete Construction and Bridges, Bratislava, Slovak Republic

• S T U



**Taywood Engineering Limited**

Australia

**“Resistance of Concrete to Harsh Environments – Ammonium Sulphate”, Taywood Engineering Limited, Perth, WA, Australia**



## Technologisches Gewerbemuseum

Austria

**“Testing of Sealing Effect re Penetration of Water”,**  
ÖNORM B 3303, Technologisches Gewerbemuseum  
(Industrial Museum of Technology), Federal Higher Technical  
Education and Research Institute, Vienna, Austria





## Technical Testing Institute of Civil Engineering Slovak Republic

**“Test for Strength of Xypex Admix-Treated Concrete Samples Under Compression”, STN 73 1317, Technical Testing Institute of Civil Engineering, Bratislava, Slovak Republic**



## Technical Testing Institute of Civil Engineering Slovak Republic

**“Test of Xypex Admix-Treated Concrete Samples for Water Tightness”, STN 73 1321, Technical Testing Institute of Civil Engineering, Bratislava, Slovak Republic**



## Technical Testing Institute of Civil Engineering Slovak Republic

**“Testing of Impermeability and Resistance of the Xypex Coating Material to Crude Oil”, Institute of Civil Engineering Technology & Testing, Bratislava, Slovak Republic**





**Technical Testing Institute of Civil Engineering**  
Slovak Republic

**“Tests of Impermeability and Resistance of the Xypex Coating Material to Gasoline, Diesel, Transformer Oil, Silage Juices and Pressurized Water”, CSN 73 1209 and CSN 73 1321, Institute of Civil Engineering Technology & Testing, Bratislava, Slovak Republic**



**Technical Testing Institute of Civil Engineering**  
Slovak Republic

**“Tests of Fluid Tightness and Resistance of the Coating Material Xypex Concentrate Against Acetone”, STN 73 1311, Institute of Technology & Testing in Civil Engineering, Bratislava, Slovak Republic**



**Technical Testing Institute of Civil Engineering**  
Slovak Republic

**“Tests of Fluid Tightness and Resistance of the Coating Material Xypex Concentrate Against Sulfuric Acid and Sulfide”, Institute of Technology & Testing in Civil Engineering, Bratislava, Slovak Republic**







## Technical Testing Institute of Civil Engineering Slovak Republic

**“Tests of Fluid Tightness and Resistance of the Coating Material Xypex Concentrate Against Turpentine”, STN 73 1311, Institute of Technology & Testing in Civil Engineering, Bratislava, Slovak Republic**



## Twin City Testing and Engineering Laboratory USA

**“Evaluation of Treated and Untreated Concrete Panels Exposed to De-Icing Chemicals”, ASTM C672, Twin City Testing and Engineering Laboratory, Inc, St. Paul, Minnesota, USA**



## Twin City Testing and Engineering Laboratory USA

**“Test to Evaluate Water Penetration Through Concrete Masonry Units”, Twin City Testing and Engineering Laboratory, Inc, St. Paul, Minnesota, USA**

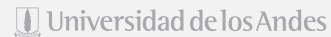




## Universidad de Los Andes

Colombia

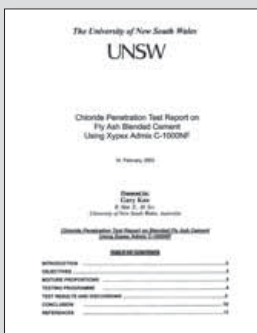
**“Test of Permeability of Concrete”**, Corps of Engineers CRD C48-73, Universidad de Los Andes, Departamento de Ingenieria Civil y Ambiental, Laboratorio de Estructuras Geotecnia y Pavimentos, Bogota, Colombia



## University of New South Wales

Australia

**“Investigation of Concrete Slabs Modified with Xypex Waterproofing Admixture”**, Building Research Centre, University of New South Wales, Sydney, NSW, Australia



## University of New South Wales

Australia

**“Chloride Penetration Tests on Xypex Admix C-1000 NF Modified Commercial Concretes”**, ASTM C1202 (modified) and NT Build 443, University of New South Wales, Sydney, NSW, Australia





## University of New South Wales

Australia

**“Plastic and Hardened State Properties of Xypex Admix C-1000 NF Modified Commercial Concretes”**, Slump (AS1012.3), Setting Time (AS1012.18), Compressive Strength (AS1012.9), Dry Shrinkage (AS1012.13), University of New South Wales, Sydney, NSW, Australia

UNSW  
THE UNIVERSITY OF NEW SOUTH WALES

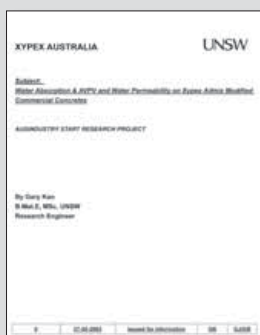


## University of New South Wales

Australia

**“Sulphate Resistance on Xypex Admix C-1000 NF Modified Commercial Concretes”**, AS2350.14, University of New South Wales, Sydney, NSW, Australia

UNSW  
THE UNIVERSITY OF NEW SOUTH WALES



## University of New South Wales

Australia

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UNSW  
THE UNIVERSITY OF NEW SOUTH WALES



## University of New South Wales

Australia

**“Chloride Penetration Test Report on Fly Ash Blended Cement Using Xypex Admix C-1000 NF”,** CSIRO modified ASTM C1202, ACCI, NT Build 443, University of New South Wales, NSW, Australia



## Water Resources Management Scientific Research Company

Hungary

**“Corrosion Resistance Studies in High Concentration Sodium Sulphate Medium”,** Water Resources Management Scientific Research Company (Vituki), Budapest, Hungary



## Warnock Hersey Professional Services Ltd.

Canada

**“Tests to Determine the Permeability of Concrete Samples Treated with Two Coats of Xypex Concentrate”,** Corps of Engineers CRD C48-73, Warnock Hersey Professional Services Ltd, Vancouver, BC, Canada





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DEPARTMENTS OF TRANSPORTATION

	<p>Departments of Transportation Approval</p> <p><b>Commonwealth of Kentucky, Transportation Cabinet</b> Frankfort, KY, USA</p>
	<p>Departments of Transportation Approval</p> <p><b>Commonwealth of Pennsylvania, Department of Transportation</b> Harrisburg, PA, USA</p>
	<p>Departments of Transportation Approval</p> <p><b>Colorado Department of Highways</b> Denver, CO, USA</p>
	<p>Departments of Transportation Approval</p> <p><b>Oregon Department of Transportation, Highway Division, Materials &amp; Research Section</b> Salem, OR, USA</p>

GENERAL

	<p>Product Approval</p> <p><b>Louisville and Jefferson County Metropolitan Sewer District</b> Louisville, KY, USA</p>
	<p>Product Approval</p> <p><b>BBA British Board of Agrément, Technical Approvals for Construction</b> Herts, United Kingdom</p>
	<p>Product Approval</p> <p><b>BSI Product Services, Construction Products Directive, Council of European Communities</b> Hertfordshire, United Kingdom</p>

GENERAL (cont.)

	<p><a href="#">Product Approval</a></p> <p><b>CEBTP Centre d'Expertise Du Batiment et des Travaux Publics</b> Saint-Rémy-Lès-Chevreuse, France</p>
	<p><a href="#">Product Approval</a></p> <p><b>City of Los Angeles, Department of Building and Safety</b> Los Angeles, CA, USA</p>
	<p><a href="#">Product Approval</a></p> <p><b>Deutsches Institut Für Bautechnik, Anstalt des Öffentlichen Rechts (DIBT)</b> Berlin, Germany</p>
	<p><a href="#">Product Approval</a></p> <p><b>ICC Evaluation Service Inc.</b> Whittier, CA, USA</p>
	<p><a href="#">Product Approval</a></p> <p><b>Instytut Techniki Budowlanej (ITB)</b> Warszawa, Poland</p>
	<p><a href="#">Product Approval</a></p> <p><b>Országos Vízügyi Főigazgatóság (OVF), State Water Conservancy Directorate</b> Budapest, Hungary</p>
	<p><a href="#">Product Approval</a></p> <p><b>Vattenfall Utveckling Certifierings, The State Power Board</b> Stockholm, Sweden</p>
	<p><a href="#">Product Approval</a></p> <p><b>VUPS Výzkumný Ústav Pozemních Staveb</b> Praha, Czech Republic</p>









GENERAL (cont.)







	<p>Product Approval</p> <p><b>Instytut Badawczy Dróg i Mostów (IBDIM), Research Institute for Roads and Bridges</b> Warsaw, Poland</p>
	<p>Product Approval</p> <p><b>SINTEF Civil and Environmental Engineering Cement and Concrete</b> Trondheim, Norway</p>
	<p>Product Approval</p> <p><b>Technický a Skúšobný Ústav Stavebný (TSUS), Building Testing and Research Institute</b> Bratislava, Slovak Republic</p>
	<p>Product Approval</p> <p><b>City of Atlanta, Department of Watershed Management</b> Atlanta, GA, USA</p>

FOOD & POTABLE WATER

 <p>Agriculture and Agri-Food Canada</p>	<p>Food Approval</p> <p><b>Agriculture Canada, Food Production and Inspection Branch</b> Ottawa, ON, Canada</p>
	<p>Potable Water Approval</p> <p><b>Eidgenössisches Gesundheitsamt, Service Fédéral de l'Hygiène Publique</b> Berne, Switzerland</p>
	<p>Potable Water Approval</p> <p><b>Australian Water Quality Centre</b> Bolivar, South Australia</p>

FOOD & POTABLE WATER (cont.)

	<p><a href="#">Potable Water Approval</a></p> <p>РЕПУБЛИКА БЪЛГАРИЯ, Republic of Bulgaria, Ministry of Health Sofia, Bulgaria</p>
	<p><a href="#">Potable Water Approval</a></p> <p>Ontario Ministry of the Environment Toronto, ON, Canada</p>
	<p><a href="#">Potable Water Approval</a></p> <p>Státní Zdravotní Ústav, State Health Institute Prague, Czech Republic</p>
	<p><a href="#">Potable Water Approval</a></p> <p>National Research Center, Water Pollution Control Laboratories Cairo, Egypt</p>
<p>Department of Water and Cleanliness</p> 	<p><a href="#">Potable Water Approval</a></p> <p>Mairie de Paris, Department of Water and Cleanliness Paris, France</p>
	<p><a href="#">Potable Water Approval</a></p> <p>Technologiezentrum Wasser (TZM), Technology Center Water Karlsruhe, Germany</p>
 <p>ORSZÁGOS TISZTIFÖRVOSI HIVATAL</p>	<p><a href="#">Potable Water Approval</a></p> <p>Országos Tisztifőorvosi Hivatal, National Health Officer's Bureau Budapest, Hungary</p>
	<p><a href="#">Potable Water Approval</a></p> <p>Ministry of Health, Public Health Service Jerusalem, Israel</p>

FOOD & POTABLE WATER (cont.)	
	<p>Potable Water Approval</p> <p><b>Japan Food Research Laboratories</b> Tokyo, Japan</p>
	<p>Potable Water Approval</p> <p><b>Singapore Institute of Standards and Industrial Research</b> Singapore</p>
	<p>Potable Water Approval</p> <p><b>DWI Drinking Water Inspectorate</b> London, United Kingdom</p>
	<p>Potable Water Approval</p> <p><b>Water Regulations Advisory Scheme</b> Gwent, United Kingdom</p>
	<p>Potable Water Approval</p> <p><b>NSF Certified Products, Public Water Supply System Components</b> Ann Arbor, MI, USA</p>
	<p>Potable Water Approval</p> <p><b>Virginia Department of Health</b> Richmond, VA, USA</p>
	<p>Potable Water Approval</p> <p><b>California Department of Health</b> Fresno, CA, USA</p>
	<p>Potable Water Approval</p> <p><b>Florida Department of Health</b> Tallahassee, FL, USA</p>

FOOD & POTABLE WATER (cont.)

 <p>STATE OF NEW YORK DEPARTMENT OF HEALTH</p>	<p><a href="#">Potable Water Approval</a></p> <p><b>New York Department of Health</b> <i>Albany, NY, USA</i></p>
 <p>Helsedirektoratet</p>	<p><a href="#">Potable Water Approval</a></p> <p><b>Helsedirektoratet, Health Services of Norway</b> <i>Oslo, Norway</i></p>
	<p><a href="#">Potable Water Approval</a></p> <p><b>State of Ohio Environmental Protection Agency</b> <i>Columbus, OH, USA</i></p>
 <p>TEXAS Department of State Health</p>	<p><a href="#">Potable Water Approval</a></p> <p><b>Texas Department of Health</b> <i>Austin, TX, USA</i></p>
	<p><a href="#">Potable Water Approval</a></p> <p><b>United States Environmental Protection Agency</b> <i>Cincinnati, OH, USA</i></p>

HEALTH SAFETY

	<p><a href="#">Health Safety Approval</a></p> <p><b>Hrvatski Zavod Za Toksikologiju, Croatian Toxicology Institute</b> <i>Zagreb, Croatia</i></p>
 <p>Government of Western Australia Department of Health</p>	<p><a href="#">Health Safety Approval</a></p> <p><b>Health Department of Western Australia, Environmental Health Branch</b> <i>Perth, Australia</i></p>



HEALTH SAFETY (cont.)

 <p>MINISTERSTVO ZDRAVOTNICTVÍ ČESKÉ REPUBLIKY</p>	<p><a href="#">Health Safety Approval</a></p> <p><b>Hlavní Hygienik České Republiky, Ministry of Health of the Czech Republic</b> <i>Prague, Czech Republic</i></p>
 <p>MINISTERSTVO ZDRAVOTNICTVA</p>	<p><a href="#">Health Safety Approval</a></p> <p><b>Ministerstvo Zdravotníctva, Ministry of Health of the Slovak Republic</b> <i>Bratislava, Slovak Republic</i></p>
 <p>Tervisekaitseinspeksioon Health Protection Inspectorate</p>	<p><a href="#">Health Safety Approval</a></p> <p><b>Tervisekaitseinspeksioon, Health Protection Inspectorate</b> <i>Tallinn, Estonia</i></p>

ENVIRONMENTAL

	<p><a href="#">Environmental Approval</a></p> <p><b>Good Environmental Choice Australia (GECA), Xypex Admix C-1000 NF &amp; C-5000 Certified “Environmentally Preferable”</b> <i>New South Wales, Australia</i></p>
	<p><a href="#">Environmental Approval</a></p> <p><b>Ministry of Environmental Protection, Technical Requirement for Environmental Labeling Products HJ456-2009</b> <i>Beijing, China</i></p>

QUALITY SYSTEMS

	<p><a href="#">Quality Systems Approval</a></p> <p><b>QMS International plc / BS EN ISO 9001:2008</b> <i>Norfolk, United Kingdom</i></p>
	<p><a href="#">Quality Systems Approval</a></p> <p><b>BSI Management Systems / ISO 9001:2008</b> <i>Mississauga, ON, Canada</i></p>





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## XYPEX PROJECTS

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## 5.1

## Water & Wastewater Treatment

Xypex products are well suited for use on concrete structures used for the collection, pumping and treatment of wastewater. Concrete pipe, lift stations and tanks must be protected from the water and aggressive chemicals common to sewage. The crystalline waterproofing technology of Xypex works within the concrete to make it impermeable and resistant to chemical attack. Wastewater is thereby contained, and the neighboring environment and the structure itself is protected.



## South District Wastewater Treatment Plant



Miami Dade, Florida  
**USA**



**XYPEX**<sup>®</sup>  
products used

- Concentrate
- Modified



***As Miami-Dade County's population continues to increase, using reclaimed water enables the MDWASD to provide a sustainable water resource for its environment and its future.***

The population growth, construction boom and a shortage of water resources are the driving forces behind this big expansion project. The plan involves reclaiming tens of millions of gallons of wastewater and a treatment process that will allow the reuse of effluent at a rate of up to 112.5 million gallons per day, making it one of the largest plants in the U.S. In phase one, over 52,000 sq. ft. of surface area was treated with the Xypex two-coat system of Xypex Concentrate and Modified to specifically waterproof and protect the flocculation and filter tanks and flumes. Phase 2 will be of equal size and Xypex coatings are again specified, while the digesters, clarifiers and pump station will utilize the immediate waterproofing and protection benefits of Xypex Admix C-1000. An estimated 400,000 lbs. of Xypex will be used in total.



### **Pine Creek Wastewater Treatment Plant**

 **Calgary, Alberta, Canada**

Xypex Concentrate and Modified (180,000 lbs.) were used to waterproof and provide chemical protection for the first phase of this major wastewater treatment facility (400,000 sq. ft.), while Xypex Admix C-500 was incorporated into the 75,000 sq. ft. slab.



### **Shebin El Koum Sewage Station**

 **Cairo, Egypt**

Over 35,000 m<sup>2</sup> of concrete at this large wastewater treatment plant in Cairo were waterproofed and protected with the Xypex crystalline waterproofing system (two coat application of Xypex Concentrate and Modified).



### **Alyeska Pipeline Water Treatment Facility**

 **Valdez, Alaska, USA**

The ballast water from the super-tankers that take on oil at Valdez is treated at this site. Xypex Concentrate was applied to the two final water-purifying tanks. After purification is complete, the water is pumped back into the ocean.



### **Cardedeu Water Purifying Plant**

 **Cardedeu, Spain**

This plant supplies Barcelona and other area towns with drinking water. The filter channels to this water purification facility were repaired and waterproofed with Xypex products.

## WATER & WASTEWATER TREATMENT



### Allegria Wastewater Treatment Plant

 **Rio de Janeiro, Brazil**

Xypex Concentrate and Modified were spray-applied to all foundation walls and slabs of this wastewater treatment facility, the largest of seven plants that serve the city of Rio de Janeiro.



### Bogota Wastewater Treatment Plant

 **Bogota, Colombia**

This is the first of three Bogota wastewater treatment plants to be treated with Xypex products. More than 5,000 kg of Xypex products were used to waterproof the structure. Xypex Patch'n Plug was also used to repair defects and stop water leakage in the concrete before application of the coating system.



### Winneba Waterworks

 **Accra, Ghana**

All cracks in the filtration tanks of this plant were repaired using Xypex Patch'n Plug, followed by a two-coat application of Xypex Concentrate and Modified.



### Seneca Wastewater Treatment Plant

 **Minnesota, USA**

Xypex products were used to repair the extensive cracking (5,000 linear feet) in pipe galleries at the old section of this plant. Xypex crystalline waterproofing system was also used to coat the chlorine contact chambers and other structures in the new section of the plant.









## 5.2

## Water Holding

Water holding structures are about keeping water *inside* and Xypex Crystalline Technology, with its ability to resist extreme hydrostatic pressure, has been used extensively to waterproof and protect the concrete of a wide variety of water holding structures including reservoirs for potable water, filtration plants, swimming pools, and aquariums.



## Ras Laffan Reservoir



QATAR



XYPEX®  
products used

- Concentrate
- Modified



*The Ras Laffan Reservoir, part of the highly prestigious Ras Laffan C project, will hold 63 million gallons and produce 275,000 m<sup>3</sup> of potable water per day by 2011.*

The Xypex two-coat system of Xypex Concentrate and Modified was used to waterproof and protect 37,999 m<sup>2</sup> of potable water tanks. The largest of these tanks will take 1½ years to fill. The benefits of Xypex Crystalline Technology – waterproofing, enhancing structural durability and the ability to resist aggressive chemicals – in this case, high salt content – made Xypex products the preferred choice for this project. Xypex products were also used on the cooling tower of 11,300 m<sup>2</sup> and the sewage treatment plant of 377 m<sup>2</sup>.

Ras Laffan C is one of the most prestigious projects in the Middle East and, by 2011, will be the largest integrated water and power plant in the country, providing 30% of Qatar's electricity and 20% of its potable water. It will also help to provide electricity to other Gulf States through a regional grid.



### San Diego Zoo



*San Diego, California, USA*

This polar bear tank was treated with both Xypex Concentrate and Modified at an application rate of 1.5 lbs. per sq. yd. The Xypex technology provided an effective, environmentally safe waterproofing system for the tank.



### Gefion Fountain



*Copenhagen, Denmark*

After removal of the statue and four pool slabs, new slabs were cast with Xypex Admix blended into the concrete mix. The Xypex coating system (Concentrate and Modified) was then applied to the existing pool walls, while Xypex Concentrate and Patch'n Plug were applied to both the positive and negative sides of the reservoir under the pump house.



### Melbourne Aquarium



*Melbourne, Australia*

The below-ground aquarium tanks and viewing areas (adjacent to the Yarra River) exhibited leakage in various areas due to cracks and defective joints. All leakage was eliminated by using the Xypex concrete repair system (Xypex Concentrate and Patch'n Plug).



### One & Only Resort Pool



*Cape Town, South Africa*

Xypex products were specified to waterproof and protect various areas of this One & Only Resort project, including two undersea tunnels, lift shafts, health spa pools, day water tank, penthouse swimming pool and the main one-million liter swimming pool (pictured here). Four Xypex products were used: Admix C-1000, Concentrate, Modified and Patch'n Plug.



### **NASA Neutral Buoyancy Pool**



*Houston, Texas, USA*

Xypex Patch'n Plug (White) was utilized to seal all joints prior to applying Xypex Concentrate (White) to waterproof the entire interior surface of the pool (approx 50,000 sq. ft.). This watertight pool provides a weightless environment to test space lab components and train astronauts for life and work in space.



### **Comodor Rivadavia Aquaduct**



*Argentina*

Xypex's unique crystalline technology was used to waterproof and protect tanks and pump stations of this 223 km aqueduct. Installation included repair of all defects, construction joints and tie holes with Xypex Patch'n Plug, followed by a two-coat application of Xypex Concentrate and Modified.



### **Portal Das Rosas Elevated Reservoir**



*Limeira, Brazil*

All cracks and other water leakage points were treated from the external side of this elevated reservoir using Xypex Patch'n Plug and Xypex Concentrate. The application was performed without any stoppage to the general operation of the reservoir.



### **Pool & Spa House**



*Clarus, Bermuda*

The Xypex crystalline waterproofing system was used throughout the swimming pool and spa areas of this exclusive Bermuda property. Application included use of Xypex Admix C-1000, Xypex Concentrate and Xypex Modified.









## 5.3

## Below Grade

More often than not, Xypex waterproofing takes place underground where concrete requires protection against any number of potentially invasive water forces. Below grade, the crystalline technology of Xypex products resists hydrostatic pressure and protects against reinforcing steel corrosion and sulfate attack.



## Willis Building



London  
United Kingdom



XYPEX®  
products used

- Admix C-1000 NF
- Concentrate



***Changing the London skyline, The Willis Building is the fourth tallest building in the city. Its progressive environmental strategy surpasses statutory carbon reduction targets and meets the highest standards for sustainability. Over 15,000 m³ of concrete was used in its construction.***

This 28-storey skyscraper, opposite Lloyd's in the heart of London's financial district, is the new headquarters of the global insurance broker, Willis Group Holdings. Designed by world-renowned architects Foster + Partners, the building won the 2007 New City Architecture Award for its unique architectural form and contribution to the streetscape and skyscape of the City of London. The project is significant in both urban and environmental terms. Most of the material from demolition of the previous building was recycled and crushed for use in the 38-meter-deep foundations.

Xypex Admix C-1000 NF was used to waterproof and protect the below-grade slab and elevator pits. Xypex Concentrate Dry-Pac was then installed in all floor-wall joints followed by a slurry coat application of Xypex Concentrate.




### **Bank of Tanzania**

 ***Dar es Salaam, Tanzania***

Two coats of Xypex Concentrate were applied to exterior of vault walls and to the floor slab. Before application of the second coat, cold joints around the perimeter of the slab were routed out, treated with a slurry coat of Xypex Concentrate and then filled with Xypex Patch'n Plug.



### **Bank of China**

 ***Beijing, China***

A high water table required the specification and use of Xypex products to waterproof and protect the basements, cash vaults, service rooms and auditorium of this IM Pei-designed Bank of China headquarters. The Xypex system was also used on the raft foundation walls and slab.



### **The Esplanade Theatres on the Bay**

 ***Singapore***

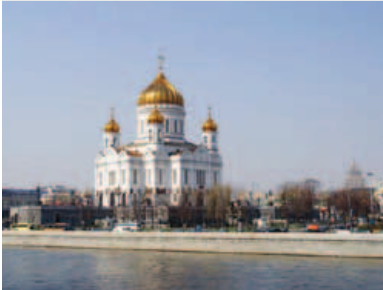
This project involved waterproofing the below-grade foundation that would be subjected to significant hydrostatic pressure and a harsh marine environment. The use of Xypex Admix accelerated the construction schedule and resulted in a time saving of more than two months: a real example of value engineering.



### **Ratusz Metro Station A-15**

 ***Warsaw, Poland***

The Xypex crystalline system was used to waterproof and protect all concrete in the Ratusz Metro subway station, including floor slabs, foundation walls, non-structural walls and ceilings.



### **Cathedral of Christ the Savior**

 **Moscow, Russia**

Xypex coating system (Concentrate and Modified) was applied to plaza deck over chapel, parking structure and pump station. Xypex FCM repair system was used at the junction of plaza and brick walls. Cracks in the below grade pipe gallery were repaired using Xypex Patch'n Plug and FCM, and this was followed by a coat of Xypex Concentrate (White).




### **Dewan Perdana Feldar**

 **Kuala Lumpur, Malaysia**

Xypex Admix C-2000 NF was used in over 7,500 m<sup>3</sup> of concrete, making up the one meter thick base slab and retaining walls of two underground car parks, to ensure water tightness. A total of 3,400 kg of Xypex Concentrate and Modified were also applied to other concrete structures at this landmark complex.



### **The Municipal House**

 **Prague, Czech Republic**

The Municipal House, constructed between 1905 and 1911, is one of Prague's cultural and architectural treasures. During its complete restoration in 1996, Xypex products were used to waterproof below-grade areas of the structure, including reservoirs and utility tunnels.



### **The Sands Casino**

 **Macau**

The foundation of this casino complex, designed by the Paul Steelman Design Group, would be subjected to high hydrostatic pressure. Xypex Admix was then specified and used to waterproof over 10,000 m<sup>3</sup> of concrete foundation, while Xypex Patch'n Plug and Concentrate were used to repair cracks and joints.



### **National Bank of Ethiopia**



**Addis Ababa, Ethiopia**

A two-coat system (Xypex Concentrate and Modified) was applied to interior of the basement area, underground vaults, and two-level parking structure. The roof slab of the above-ground parking structure was also treated with Xypex products.



### **Benziger Family Winery**



**Napa Valley, California, USA**

Xypex Admix, with a colored pigment, was specified and used to stop water penetration into the underground areas and wine-storage caves at this well-known family winery in the Sonoma wine country. Xypex Patch'n Plug was also used to repair large cracks.



### **The Waterfront Centre**



**Vancouver, British Columbia, Canada**

Ten thermal storage tanks, ten elevator pits and four sump pits were waterproofed with Xypex products at this hotel and office complex on Vancouver's harbour waterfront. The total area treated was approximately 7,450 m<sup>2</sup> (80,000 sq. ft.). In addition, Xypex Concentrate and Patch'n Plug were used to repair approximately 1,200 meters (4,000 lin. ft.) of construction joints.



### **Saifee Hospital**



**Mumbai, India**

The Xypex crystalline waterproofing system was applied to the floors and retaining walls of the three-level basement at this major multi-specialty hospital overlooking the Arabian Sea. The Xypex coating application was performed on the negative side (against the water pressure).







## 5.4

## Tunnels

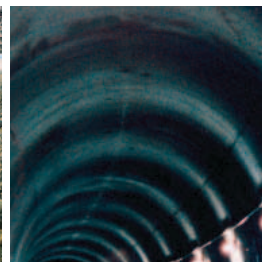
Tunnels serve many purposes such as transporting people or goods, accessing minerals from deep in the earth, or providing conduits for electrical and telecommunications services. Proper waterproofing of tunnels is one of the most cost effective ways to enhance safety and function as well as increase the service life of these structures. Xypex Crystalline Technology, and its ability to resist extreme hydrostatic pressure, aggressive soils and traffic contaminants, is used the world-over to waterproof, protect and enhance the durability of tunnels.



## Washington DC Metro System



Washington, D.C.  
USA



XYPEX®  
products used

- Concentrate
- Modified
- Patch'n Plug



***Metrorail, commonly called Metro, is the second-busiest rapid transit system in the United States in number of passenger trips. Since opening in 1976, the Metro network has grown to include five lines, 86 stations, and 106.3 miles (171.1 km) of track.***

Xypex products were specified by Bechtel Corp and the Washington Metropolitan Transit Authority for use at various locations of the metro area subway system, including sections in central Washington D.C., Bethesda (Maryland), Chevy Chase (Maryland) and Alexandria (Virginia). Areas of application included tunnel sections, large shotcrete vaults, passageways, mechanical rooms, equipment vaults, elevator shafts and various areas in metro stations.

The Xypex system was not only used to treat large surface areas but was also used extensively for the repair of severe leakage problems caused by concrete defects and exposure to strong hydrostatic pressures.



### **Susten Pass Road Tunnel**

 **Innertkirchen, Switzerland**

The concrete of this 1949 tunnel deteriorated over time resulting in substantial water seepage through cracks and degraded areas. With freezing temperatures this created a traffic hazard. New concrete replaced the old, and the Xypex coating system (Concentrate and Modified) was used to waterproof and protect it.



### **Sao Paulo Metro System**

 **Sao Paulo, Brazil**

Two subway stations were treated with the Xypex Crystalline Technology to prevent water penetration. First, cracks were repaired using Xypex Concentrate Dry-Pac, followed by a two-coat application of Xypex Concentrate and Modified. An additional 38 stations in Sao Paulo are to be waterproofed and protected with Xypex products.



### **Vuoli Harbour Tunnel**

 **Finland**

Xypex Admix C-1000 NF was used to waterproof and protect the 50 mm thick shotcrete lining of this rail and two road tunnel located under the Helsinki harbor. The concrete mix design used 470 kg of Portland cement per cubic meter, and the Xypex Admix was dosed at 1.1% (5 kg) per m<sup>3</sup>.



### **Ankara Subway**

 **Turkey**

Xypex Patch'n Plug was used to repair 11,000 meters of cracks and construction joints in this subway tunnel, stopping all water ingress. Xypex Concentrate and Modified were then applied to surface areas to waterproof and protect the concrete.

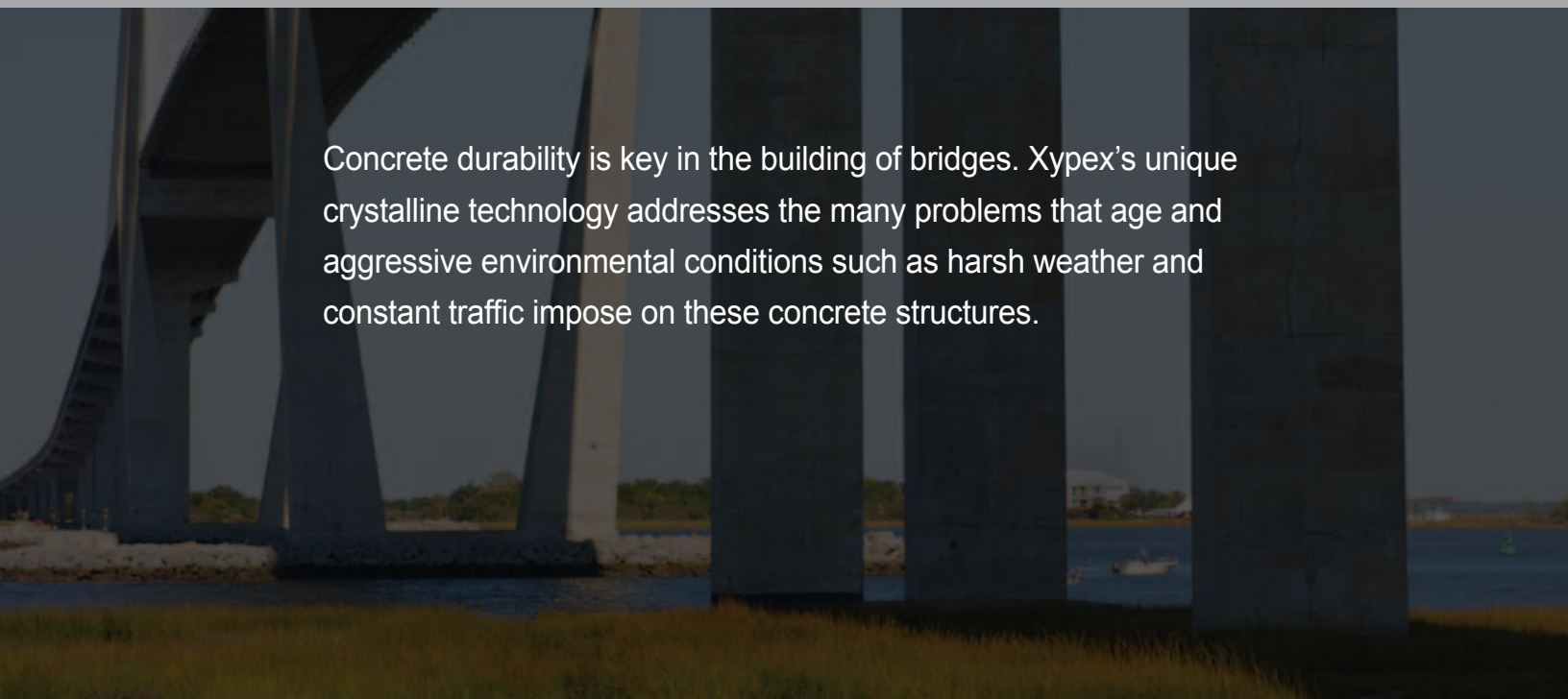




## 5.5

## Bridges

Concrete durability is key in the building of bridges. Xypex's unique crystalline technology addresses the many problems that age and aggressive environmental conditions such as harsh weather and constant traffic impose on these concrete structures.



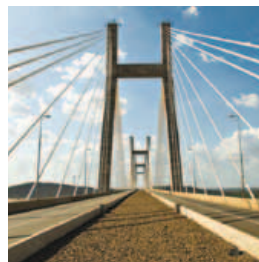


## Second Orinoco River Bridge



Ciudad Guayana

**VENEZUELA**



**XYPEX®**  
products used

- Concentrate



*The Orinoco and its tributaries constitute the northernmost of South America's four major river systems. The bridge is a 3.2 km (2 miles) long road-rail crossing, carrying four lanes of highway traffic separated into two carriageways by a single railway track in the centre.*

The general contractor, Constructora Norberto Odebrecht, S.A., concerned about water seepage and possible corrosion of the reinforcing steel in the concrete forming the base for the railway, used Xypex to waterproof and protect it. Odebrecht was confident in Xypex Crystalline Technology having used it successfully on the Metro project in Caracas. Prior to the Xypex application, there was already obvious leakage from the concrete.

This problem ceased after the application of over 63,000 lbs. of Xypex Concentrate to the concrete base and walls underlying the rail track.



### **Aomori Bay Bridge**

 **Aomori, Japan**

The main beams of the precast girder box were exposed to salt corrosion damage from the ocean. Xypex Crystalline Technology, because of its resistance to effects of marine environments, was applied to the bottom plates including plates of the main girder, horizontal keyways, non-expansion vertical construction joints, exterior walls and top deck slab.



### **Kaunas Bridge**

 **Kaunas, Lithuania**

The support columns of the old bridge were treated with Xypex Concentrate. The Xypex coating system was also used on the entire undersides of the two new bridges.



### **Skala - Nemsova Motorway Bridge**

 **Slovakia**

This motorway concurrently forms a flood barrier to the Vah River. A two-coat application of Xypex Concentrate and Modified was used to waterproof the run-off channels and pits where highway water, carrying oils and chemicals are collected. The columns on several of the bridge sections were also treated with a two-coat Xypex application.



### **Bedaling Expressway Overpass**

 **Beijing, China**

The Bedaling Expressway, located outside of Beijing and leading to the Great Wall, includes 4 overpasses which were waterproofed using Xypex Concentrate and Xypex Patch'n Plug.







## 5.6

## Marine Structures

Xypex Crystalline Technology protects concrete structures in marine environments – structures that are exposed to the damaging effects of seawater, chlorides and other aggressive elements. Preventing corrosion of reinforcing steel and resulting concrete degradation has made Xypex an important treatment for a variety of marine installations including wharfs, bridge pilings, locks, desalination conduits and seawalls.

## Panama Canal



### PANAMA



**XYPEX®**  
products used

- Admix C-1000
- Admix C-2000



*Since 1914, the Panama Canal has been a conduit of world importance, providing a link between two great oceans, a passageway annually for more than 14,000 vessels carrying more than 200 million tonnes of cargo.*

Since 1995, Xypex products have been integral to an ongoing program of upkeep and refurbishment of the canal, the revitalization of concrete that has stood the grueling test of more than 80 years of continuous service.

Xypex Admix has been used to re-surface the 30-foot diameter culverts which pump water into and out of the locks. After prolonged use, the walls of the culvert became rough, with exposed aggregate causing turbulence and a slow fill and dump cycle. By smoothing out the surface of the concrete with an inch-thick Xypex shotcrete coating, which also reduced water loss, the locks can fill and empty seven minutes faster on each cycle. This permits the passage of more ship traffic through the canal system.






### **Sea Bus Docks**

 **Vancouver, British Columbia, Canada**

The post-tensioned steel reinforcing cables of two large floating concrete docks were placed too close to the bottom surface, and therefore were exposed to salt corrosion. The docks were removed from the water and Xypex Concentrate was applied to the undersides. Following curing, they were placed back into the water and have exhibited no further corrosion.



### **Sempra Energy Natural Gas Terminal**

 **Ensenada, Mexico**

More than 25,000 lbs. of Xypex Concentrate were used to protect the concrete from the harsh marine environment and the potential for deterioration due to chloride exposure. The breakwater is 1,300 meters long.



### **Singapore Marina Barrage**

 **Singapore**

The Barrage consists of nine steel crest gates and spans the 350 meters wide Marina Channel, separating seawater from freshwater and acting as a tidal barrier. More than 7,000 kg of Megamix II were used to shape and protect the Barrage gates. Megamix was selected to meet the fine (1 mm) tolerance specifications and its ability to withstand the harsh marine environment.



### **Cronulla Marina**

 **Sydney, Australia**

The concrete mix used at this marina included Xypex Admix C-2000 added at a dosage rate of 4 kg/m<sup>3</sup>, and was designed to achieve 32 MPa at 48 hours and 50 MPa in seven days. The two-tonne post-tensioned units of these floating concrete structures had to be lifted from their formwork 36 - 48 hours after casting.





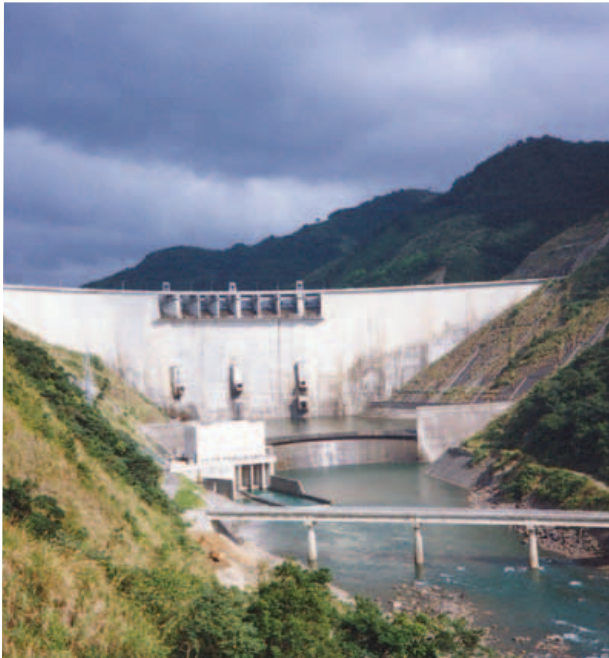
## 5.7

## Dams

Dams, whether for hydroelectric production or water management, are all about water – keeping it secure and protecting the unique components that are engineered into every dam structure. Xypex Crystalline Technology has been specified worldwide for the waterproofing and protection of dams, including upstream and downstream faces, pipe galleries, discharge chambers and spillways.



## Fei Cuei Dam



Hsin Tien  
**TAIWAN**



**XYPEX®**  
products used

- Concentrate
- Modified



*The Fei Cuei Dam, the largest concrete dam in Taiwan, is located 30 km south of Taipei City near the mouth of Beishi Creek. The Fei Cuei Reservoir provides the Taipei water supply region with a dependable source of water for domestic and industrial use. The dam and reservoir were put in use in January 1979.*

The Fei Cuei Dam is a three-centered double curvature with variable thickness arch dam and includes eight crest spillways, three sluiceways and one tunnel spillway. The dam is 122.5 m high and was built with 700,000 m<sup>3</sup> of concrete. When water began seeping through the wall joints of the dam, The Water Conservation Bureau of Taiwan specified Xypex to solve the problem.

The Xypex two-coat application of Xypex Concentrate and Modified eliminated all seepage, waterproofed the structure, and thereby prevented oxidation of the reinforcing steel.



### Ogrezeni Dam Spillway

 **Bucharest, Romania**

This dam structure is located on the Arges River, 25 km west of Bucharest. The reservoir was created to provide added security and quality to the water supply. Cracks and joints (275 meters) on the spillway surface were repaired using Xypex Patch'n Plug to prevent leakage into the service gallery. A coat of Xypex Concentrate was then applied over the repaired areas.



### Huaylacancha Dam

 **Huancayo, Peru**

Xypex Patch'n Plug was used to repair cold joints after the parge surface coat was removed from the upstream and downstream faces of this dam. Both Xypex Concentrate and Modified were then used to waterproof the upstream face, while a single coat of Xypex Concentrate was used on the downstream face.



### Zawada Mill Dam

 **Zawada, Poland**

Extreme hydrostatic pressure was causing leakage through the concrete in the pipe gallery. Xypex Concentrate was applied on all interior surfaces to prevent further water infiltration.



### Dau Tieng Dam

 **Tay Ninh Province, Vietnam**

After a successful trial application in 1997, Xypex products were specified and used to waterproof the upstream discharge chamber (400 m<sup>2</sup>) of this dam. A Xypex representative provided on-site technical support to ensure proper application.







## 5.8

## Power Generating Facilities

Ensuring the integrity of concrete structures and, at the same time, protecting the surrounding environment is critical in the power industry. Xypex Crystalline Technology products have made an important contribution in waterproofing and protecting hydroelectric facilities, desalination plants, thermal and nuclear power stations and cooling tower basins.

## J-Parc Synchrotron



Tokai-mura  
**JAPAN**



**XYPEX®**  
products used

- Concentrate



***The Japan Proton Accelerator Research Complex (J-PARC) is a new high intensity proton accelerator using MW class high power beams up to 50 GeV – the highest beam power of any accelerator in the world.***

The site is subject to a high water table and is adjacent to the ocean – presenting contamination challenges that could affect the accelerator's sensitive functions.

Xypex Crystalline Technology, because of its waterproofing effectiveness, resistance to the marine environment, and its compatibility with the radioactive process, was specified by major firms involved in the construction coalition that built the accelerator – a 3.5 km circular tunnel encased in concrete up to five meters thick. Xypex Concentrate was used on the mud slab and Xypex Dry-Pac was applied to the preformed horizontal keyways and non-expansion vertical construction joints. In a two-coat application, sixty tonnes of Xypex Concentrate was then spray-applied to the exterior walls and roof slab, covering a total area of 50,000 m<sup>2</sup>.



## POWER GENERATING FACILITIES



### Wolsung Nuclear Plant

 **South Korea**

Xypex products were used to repair cracks and coat surface areas in the intake and discharge conduits of this nuclear plant. The conduits are utilized in the process of cooling water.



### Bogong Power Station

 **Bogong, Mt. Beauty, Australia**

Xypex Admix C-Series was specified for use in 12,000 m<sup>3</sup> of concrete for this new power station development, designed to provide an additional 140 MW to the Kiewa hydroelectric scheme. The Xypex system was used to enhance long-term durability and provide added waterproofing integrity for this vital infrastructure development.



### Transformer Stations

 **Ljubljana, Slovenia**

The chemical and chloride protection ability of the Xypex Crystalline Technology was put to use in repairing the deteriorating concrete structure underneath the transformers at this electrical facility. Xypex Concentrate and Patch'n Plug were applied to three transformer stations to prevent oily substances leaching into the surrounding soil.



### Shoaiba Power & Desalination Plant

 **Red Sea, Saudi Arabia**

This facility is considered one of the largest desalination plants in the world. The Xypex coating system was used to waterproof the pump house located below sea level and the concrete canals for intake and outtake of the sea water.







5.9

## Precast

Using the Xypex Admix C-Series of products, precast manufacturers can add value to their products. Xypex Admix is blended into the concrete at time of batching enabling companies manufacturing precast products such as manholes, box culverts, pipe, architectural panels and highway median barriers to waterproof and protect their products before they leave the plant.

## Jacksonville Electrical Authority Wharf



Jacksonville, Florida  
USA



**XYPEX®**  
products used

- Admix C-1000 NF



*The Jacksonville Electric Authority, supplier of electricity and water to the city of Jacksonville, is the operator of this wharf that serves as the receipt point for fuel oil used by their electrical plant. Two pipelines extend from the wharf to storage tanks at the rear of the plant.*

During construction, a primary concern was maintaining the integrity of the concrete used in the pile driven piers. Engineers Black and Veatch and the contractor, Gate Concrete Products were familiar with the ability of Xypex Crystalline Technology to self heal any micro-cracks that might occur from the pile driving process and specified Admix C-1000 NF accordingly. Xypex Admix was also used in the U-beams and on the wharf's slab.

Overall, 160,000 lbs. (73,000 kg) of Xypex Admix C-1000 at a dosage rate of 1.5% of the cement content was blended into the concrete to provide waterproofing and chemical protection from the harsh marine environment.





### **Pennsylvania Turnpike**

 **Pennsylvania, USA**

In a four year program that involved the use of more than 1.5 million pounds of product, Xypex Admix was used in 150 miles of precast concrete barriers and 5 miles of retaining walls that serve the busy northeast U.S. connector.



### **Precast Septic Tanks**

 **Nanaimo, British Columbia, Canada**

To ensure protection from an aggressive environment, Xypex Admix C-500 was added to the concrete mix at time of batching for these precast septic holding tanks.



### **Vicksburg Sewer Main**

 **Mississippi, USA**

Xypex Admix C-1000 was added to the concrete pipe at a rate of 3% by weight of Portland cement. The Xypex additive was selected over a traditional protective coating, to provide chemical protection and to prevent water ingress and egress.



### **Hisense Arena**

 **Melbourne, Australia**

Xypex Admix C-1000 NF was blended into the concrete mix to waterproof and protect the precast bleachers for this multipurpose stadium (formerly named the Vodafone Arena). The seating design of this stadium is stunningly innovative and the contractors used the latest technology to ensure that the arena would accommodate a wide range of functions.

# Beingthere

Xypex products and services are available in over 70 countries. *Being There* means we know the territory and that knowledge benefits our customers. We look forward to your inquiries.



EUROPE



AUSTRALIA



ASIA



AFRICA



NORTH AMERICA



SOUTH AMERICA

- |                      |             |                |                        |
|----------------------|-------------|----------------|------------------------|
| - ARGENTINA          | - ERITREA   | - KUWAIT       | - SINGAPORE            |
| - AUSTRALIA          | - ESTONIA   | - LITHUANIA    | - SLOVAK REPUBLIC      |
| - BANGLADESH         | - ETHIOPIA  | - MALAYSIA     | - SLOVENIA             |
| - BARBADOS           | - FIJI      | - MEXICO       | - SOUTH AFRICA         |
| - BELGIUM            | - FINLAND   | - MONACO       | - SPAIN                |
| - BERMUDA            | - FRANCE    | - NEPAL        | - SRI LANKA            |
| - BRAZIL             | - GERMANY   | - NETHERLANDS  | - SWITZERLAND          |
| - BULGARIA           | - GHANA     | - NEW ZEALAND  | - TAIWAN               |
| - CANADA             | - HONG KONG | - NORWAY       | - TANZANIA             |
| - CHILE              | - HUNGARY   | - PANAMA       | - THAILAND             |
| - CHINA              | - ICELAND   | - PERU         | - TURKEY               |
| - COLOMBIA           | - INDIA     | - PHILIPPINES  | - UKRAINE              |
| - COSTA RICA         | - INDONESIA | - POLAND       | - UNITED STATES        |
| - CROATIA            | - IRAN      | - PORTUGAL     | OF AMERICA             |
| - CYPRUS             | - IRELAND   | - PUERTO RICO  | - UNITED ARAB EMIRATES |
| - CZECH REPUBLIC     | - ISRAEL    | - QATAR        | - UNITED KINGDOM       |
| - DENMARK            | - JAPAN     | - ROMANIA      | - VENEZUELA            |
| - DOMINICAN REPUBLIC | - JORDAN    | - RUSSIA       | - VIETNAM              |
| - ECUADOR            | - KENYA     | - SAUDI ARABIA |                        |
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To find a Xypex distributor in your area, please email us at [enquiry@xypex.com](mailto:enquiry@xypex.com) or visit our website at [www.xypex.com](http://www.xypex.com).