



## CONCENTRATE DS-1

07160 | CEMENTITIOUS CRYSTALLINE

Concrete Waterproofing

### 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 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, "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.

## 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 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-shaked 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 Manu-

facturer 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.



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