

HIPPO ENCLOSURE TANKS – St. Louis Zoo

PART 1 – PRODUCTS

1.01 MATERIALS

- A. **Acceptable Manufacturer:**
Xypex Chemical Corporation
13731 Mayfield Place, Richmond, B.C., Canada V6V 2G9
Tel: 816-605-8260 e-mail: bill.raymond@xypex.com

Note: Acceptable manufacturers include all licensed manufacturing operations of Xypex Chemical Corporation.

- B. **Proprietary Products:** Xypex crystalline waterproofing materials as follows:
1. Xypex Concentrate
 2. Xypex Patch'n Plug
- C. **Substitutions:** No substitutions permitted.
- D. **Source Quality:** Obtain all proprietary crystalline waterproofing products from a single manufacturer.

1.02 MIXES

- A. **General:** Mix waterproofing material by volume with clean, potable water. 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 ²)	5 powder to 2 water
2.0 lb./sq. yd. (1.0 kg/m ²)	3 powder to 1 water

- 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 ²)	5 powder to 3 water

- D. **Crack Mix:** Using a trowel, mix 1 part clean water with 3.25 – 3.5 parts Xypex Patch'N Plug powder to stiff consistency. Do not mix more than can be used in 3 minutes.

PART 3 – EXECUTION

2.01 EXAMINATION

- A. **Site Visit:** Prior to waterproofing installation, arrange project site visit with waterproofing manufacturer's representative.
- B. **Verification of Substrates:** Verify that concrete surfaces are sound and clean, and that form release agents, materials used to cure the concrete and any existing coatings are fully removed.
- C. **Examination for Defects:** Examine surfaces to be waterproofed for defects such as honeycombing, rock pockets, faulty construction joints and cracks. Such defects to be repaired in accordance to manufacturer's product data.

2.02 PREPARATION

- A. **Surface Preparation:**
A minimum of CSP-3 per the International Concrete Repair Institute Concrete Surface Profile Chips or other equivalent standard is required.
- B. **Repair of Defects:** Concrete defects shall be repaired in accordance with manufacturer's technical literature including relevant Method Statements found at www.xypex.com
 - 1. Cracks and Faulty Construction Joints:
 - a. Chip out cracks, faulty construction joints and other defects to a depth of 1.5 inches and a width of one inch. A "V" shaped slot is not acceptable. The slot may be saw cut instead of chipped but ensure that the slot is dovetailed or otherwise shaped such that there will be mechanical interlock of materials placed into the slot at a later stage.
 - b. Clean slot of debris and dust. Soak area with water and remove excess surface water.
 - c. Form Patch'n Plug with gloved hand. Place Patch'n plug into cavity pressing firmly until Patch'n plug is hard.
 - 2. Rock Pockets, Honeycombing or other defective concrete: All areas of poor concrete consolidation (honeycomb or rock pockets) shall be repaired.

Note: Where there is active water-flow see Method Statements or contact Xypex Technical Services Representative for assistance.

- C. **Wetting Concrete:** Xypex requires a saturated surface dry (SSD) substrate. Concrete surfaces must be thoroughly saturated with clean water prior to the application so as to aid the proper diffusion of the Xypex chemistry and to ensure the growth of the crystalline formation deep within the pores of the concrete. Remove excess water before the application such that there is no glistening water on the surface. If concrete dries out before application, it must be re-wetted.

2.03 APPLICATION

B. **Sealing Strips:** Where hydrostatic conditions exist, sealing strips shall also be applied at construction joints by filling grooves that are created along the joints. Dimensions of the grooves shall be 1 inch wide and 1.5 inches deep. If grooves are not pre-formed then chip grooves to those dimensions. Fill the grooves as follows:

- a. Chip out cracks, faulty construction joints and other defects to a depth of 1.5 inches and a width of one inch. A “V” shaped slot is not acceptable. The slot may be saw cut instead of chipped but ensure that the slot is dovetailed or otherwise shaped such that there will be mechanical interlock of materials placed into the slot at a later stage.
- b. Clean slot of debris and dust. Soak area with water and remove excess surface water.
- c. Form Patch’plug with gloved hand. Place Patch’n plug into cavity pressing firmly until plug is hard.

Note: For further information, see Xypex Schematic Drawings for standard construction joint details.

C. **Form Tie Holes:** Form tie holes shall be waterproofed in accordance with manufacturer’s technical literature including relevant Method Statements

D. **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 to concrete surfaces with semi-stiff bristle brush, push broom (for large horizontal surfaces), or suitable spray equipment. The Xypex coating must be uniformly applied and should be just under 1/16” thick.

Application rates and locations shall be as indicated in the drawings or project specification 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: Apply Xypex Concentrate slurry coat to locations indicated on drawings in accordance with manufacturer’s product data.
2. Second Coat: Apply Xypex Concentrate slurry coat after the first coat of Xypex Concentrate has reached an initial set but while it is still “green” (less than 48 hours). Curing by misting the coating with water should be done between coats. Ensure first coat is in SSD condition before application of the second coat.

Note: Prior to the installation, it is recommended that a test section be completed under anticipated ambient and project conditions to demonstrate acceptable bond

2.04 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. Wet burlap and some specialty curing blankets are also effective for curing during 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 air circulation exists in treated areas, it may be necessary to provide fans or blown air to aid in curing of waterproofing treatment.
- C. **Water Holding Structures:** For water holding structures such as the Hippo Enclosure Tank, cure Xypex treatment for three days and then allow treatment to set for 12 days before filling.
- D. **Protection:** During the curing period, protect treated surfaces from damage by wind, sun, rain, puddling of water and temperatures below 36°F (2°C). If plastic sheeting is used for protection, it must be raised off of the waterproofing coating to allow sufficient air circulation.

2.05 INTERFACE WITH OTHER MATERIALS

- A. **Paint, Epoxy or Similar Coatings:** Do not proceed with surface preparation or application of paint or other coatings until waterproofing treatment has cured and set for a minimum of 21 days. Light abrasive blasting or washing the Xypex surface with a 3 - 5% acid solution followed by a rigorous rinse with clean water is recommended before applying the coating. Be sure to flush all acid off the surface. Alternately, removal of the Xypex coating by high pressure washing or abrasive blasting following full curing is acceptable. Consult epoxy and paint manufacturer for additional coating instructions and restrictions.
- C. **Grout, Cement Parge Coat, Plaster or Stucco:** It is recommended that any other cementitious system be applied over the Xypex coating after the Xypex has completely set but while it is still "green" (12 to 48 hours). The 12 to 24 hour window is considered ideal. Contact your Xypex Technical Services Representative regarding surface preparation and other procedures for installations of other materials onto Xypex coatings older than 48 hours. Alternately, removal of the Xypex coating by high pressure washing or abrasive blasting following full 21 day curing is acceptable. Use of a polymer additive to help improve bond in the over coating mortar mix should be considered.
- 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.

Note: Prior to the installation, it is recommended that a test section be completed under anticipated ambient and project conditions to demonstrate acceptable bond.

2.06 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. **Testing for Tanks and Foundation Works**
1. Testing: Fill tanks or, for foundation works, shut off dewatering system as soon as practical so that the structure shall be exposed to its normal service conditions. Examine for leaks.
 2. Monitoring:
 - a. Actively leaking cracks and joints shall be left to self-heal for as long as practical. Depending on job site and ambient conditions crack healing can be expected to take several days to weeks.
 - b. Any crack or joints that do not heal in the allowable time frame shall be repaired by the general contractor.
 - c. Moving cracks shall be repaired using polyurethane injection or other appropriate method.
 3. Repair: Use Xypex repair procedures to seal any static crack or joint that does not self-heal. See Method Statements (www.xypex.com/technical/statements) or contact Xypex Technical Services Representative for appropriate repair procedures.

Note: Lower temperatures will extend the times for crystalline development.

2.07 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 until the coating is hard enough to not be damaged. In normal conditions protect from pedestrian traffic for 3 days and vehicular traffic for 7 days. If coatings will be exposed to ongoing vehicular traffic or other abrasive environments consult Xypex Technical Services.