XYPEX® Method Statement

NEGATIVE SIDE WATERPROOFING OF BELOW GRADE CONCRETE

Leak Repair & Waterproofing of Sumps, Elevator Pits and Other Below Grade Concrete

2022-07-20

It is very common to use Xypex products, installed on the negative side, to stop water leakage through concrete. Repair work for issues similar to those illustrated in the photos below are completed on the negative or inside surfaces of concrete using Xypex products many times every day in over 90 countries around the world in which Xypex is directly represented. Xypex also has repair procedures for CMU, Brick and Stone works. These procedures may be found at the Xypex Method Statements web page (see link below).

Examples of below grade structures that are leaking and in need of repair

Example of a prepared slot

The link below takes you to a list of “Xypex Method Statements” that describe in detail the use of Xypex Coatings and repair products for various repair scenarios.

https://www.xypex.com/technical-resources/application/

For Concrete with Apparent Defects

Below is a condensed document that outlines the general steps for repair of wet and/or leaking below grade concrete structures or where the concrete has other obvious defects. The steps are as follows.

1) Inspect the concrete surfaces for actively leaking construction joints, control joints or cracks. Also inspect for cracks larger than 0.02” (0.5 mm) – which is the size of crack Xypex coatings will heal per published literature. Chip or cut open the cracks or joints to a “U” shaped slot 1” (25 mm) wide by 1.5” (37 mm) deep. Extend the slot to about 12” (300 mm) beyond the area of concern. Any cracks that are 0.02” (0.5 mm) or narrower and are not actively leaking may be left.

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Example of Poor Wall to Slab Joint Consolidation

Examples of areas of poor concrete consolidation

Minimum recommended profile

Well profiled surface

2) Inspect the wall to slab interface joints for leaking areas or areas that look poorly consolidated. At these locations chip or cut open a “U” shaped slot 1” (25 mm) wide by 1.5” (37 mm) deep with the bottom of the slot centered over the joint. Remove all of the poorly consolidated con- crete. Extend the slot to about 12” (300 mm) beyond the area of concern.

3) Inspect the walls and slab for areas with poor concrete consolidation that may be damp or have point leaks. Saw cut the perimeter of the areas of poor consolida- tion and chip out the poorly consolidated concrete. At any point leaks chip to a depth of 1.5” (37 mm) to create a “U” shaped depression.

If the walls and slab have a number of cracks that are evident but are smaller than 0.02” (0.5 mm) and are not leaking, or the concrete is generally moist or “weeping” in various locations it is advised to coat the entire area with a one or two coat application of Xypex Concentrate or Xypex Concentrate followed by Xypex Modified.

4) i) If the entire area will be coated then profile the con- crete, including all repair areas, to achieve a clean, open pored, tooth and suction surface and to remove latents (ICRI CSP-3 profile). This is normally achieved by a light to medium sand blast or a 4,500 psi (300 bar) pressure wash. Grinding may also be effective with a course wheel or disk. If the surface is sand blasted or ground it will then need to be washed to remove dust.

ii) If the area is generally defect free except for the chipped cracks and joints, then clean the chipped slots and the concrete to 6” (150 mm) to either side of the slot with a medium sand blast or a 4,500 psi (300 bar) pressure wash (as above) to remove debris and dust and provide an appropriately profiled surface.

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5) Repair the chipped open cracks, joints and point leak areas with the procedures shown in the method statement found at the link above. The procedure is generally:

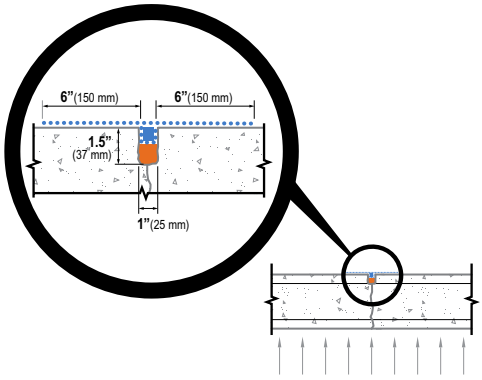
A) For locations showing any water flow:

- Stop the water flow by filling the bottom half of the slot with Xypex Patch'n Plug made into a stiff mortar.
- Apply Xypex Concentrate made into a slurry into the slot, over-coating the Patch'n Plug and extending beyond the slot about 6" (150 mm) at each end.
- Fill the rest of the slot with Xypex Concentrate made into a dry-pac consistency.

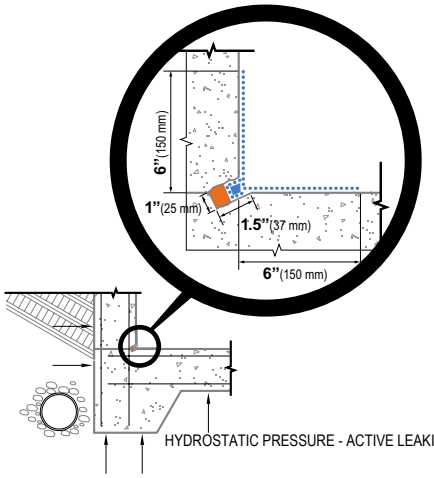
B) For cracks and joints that are dry during the repair:

- Bring the slot and surrounding concrete to a saturated surface dry condition.
- Apply Xypex Concentrate made into a slurry into the slot extending beyond the slot about 6" (150 mm) at each end.
- Fill the slot with Xypex Concentrate made into a dry-pac consistency.

Assembly for areas with active water flow

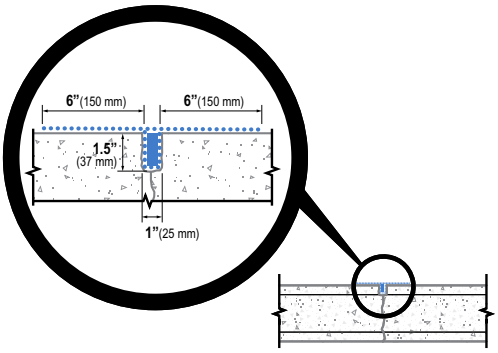


HYDROSTATIC PRESSURE - ACTIVE LEAKING WATER

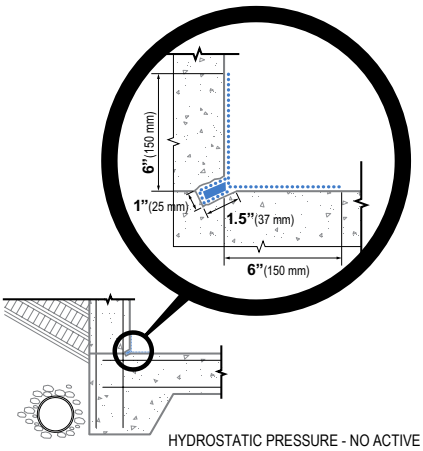


HYDROSTATIC PRESSURE - ACTIVE LEAKING WATER

Assembly for areas with no active water flow



HYDROSTATIC PRESSURE - NO ACTIVE LEAKING WATER



HYDROSTATIC PRESSURE - NO ACTIVE LEAKING WATER

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6) Repair the chipped excavations where poorly consolidated concrete was removed. If there were point leaks found after removal of the concrete these are to be repaired per the procedures above. Note that the chipped areas should be sand blasted or pressure washed at 4,500 psi (300 bar) to remove "bruised" or micro fractured concrete that is left behind by the chipping process. The concrete should be in a saturated surface dry (SSD) condition and a scrub coat of Xypex Megamix II or Xypex Patch'n Plug should be applied to the concrete surface just prior to installation of these repair mortars. Refill the void to the surface. The repair should be given a broom finish to provide profile for the coatings that will be subsequently applied.

7) If the walls and floor are not to receive Xypex Coatings then apply a final coat of Xypex Concentrate mixed to a slurry consistency over the repair areas. This provides additional water to aid in curing the Xypex Dry-Pac as well as improving the final look of the repair. Extend the Xypex Concentrate to 6" (150 mm) on either side of the repair areas. It is recommended that the Xypex Concentrate Dry-Pac repairs be kept moist for at least 12 hours and the Megamix II repair areas be kept moist for 2 - 3 days. This completes the repairs where the entire concrete surface will not be coated.

8) If the entire area of the wall and floor are to be coated, bring the concrete to an SSD condition. It is recommended that the concrete surface be fully wetted several times to the point that it will not absorb any more water. After the concrete has been fully saturated allow the surface to dry until there is no glistening water.

9) Apply a first coat of Xypex Concentrate to the concrete at a rate of 1.25 - 1.5 lb/sq.yd. (0.65 - 0.8 kg/m^2) or 2 lb/sq.yd. (1 kg/m^2) in single coat applicaitons.

10) Allow the first coat to gel or set such that it will not be disturbed when the second coat is applied onto it. Keep the coating moist during this time. Applying the first coat on day one and the second coat on day two is a good way to stage work but often in smaller projects the first coat will be allowed to set for 3 - 4 hours and then the second coat will be applied. The time needed between coats will vary depending on temperatures.

11) Apply a second coat of Xypex Concentrate or a coat of Xypex Modified at a rate of 1.25 - 1.5 lb/sq.yd. (0.65 - 0.8 kg/m^2).

12) Keep the coating moist for 2 - 3 days misting as required to maintain it in a "green looking" condition. Where available, Xypex Gamma Cure may be used to reduce the need for misting in keeping the coating moist during the 2 - 3 day curing period. This completes the repairs.

Upon drying some of the Xypex coated areas, normally around the areas that were leaking, may remain wet or damp. Xypex crystalline waterproofing depends on 1) diffusion of the Xypex chemistry from the coating into the concrete and then 2) the development of a secondary crystalline structure within the cement matrix and cracks. The Xypex reaction is cement chemistry based and just as Portland cement takes days to weeks to gain strength, the Xypex crystal structure takes days to weeks to develop and thus close down the leak paths in the concrete. Normally, over time, these wet areas will diminish in size and the walls will become dry.

For Concrete with No Apparent Defects or Leakage

For below grade concrete with no active water flow, no apparent poor consolidation in the concrete and only hairline cracks smaller than 0.02" (0.5 mm) the following is normally sufficient for waterproofing of the structure.

1. Profile the concrete that is to be waterproofed to achieve a clean open pored, tooth and suction surface (ICRI CSP-3 profile). This is normally achieved by a light to medium sand blast or a 4,500 psi (300 bar) water pressure wash. If the surface is sand blasted it will then need to be washed to remove dust.

2. Bring the concrete to an SSD condition. It is recommended that the concrete surface be fully wetted several times to the point that it will not absorb any more water. If this step follows pressure washing additional wetting may not be required. After the concrete has been fully saturated allow the surface to dry until there is no glistening water.

3. Apply a first coat of Xypex Concentrate at a rate of 1.25 - 1.5 lb/sq.yd. (0.65 - 0.8 kg/m^2).

Allow the first coat to gel or set such that it will not be disturbed when the second coat is applied onto it. Keep the coating moist during this time. Applying the first coat on day one and the second coat on day two is a good way to stage work but often in smaller projects the first coat will be allowed to set for 3 - 4 hours and then the second coat will be applied. The time needed between coats will vary depending on temperatures.

4. Apply a second coat of Xypex Concentrate or a coat of Xypex Modified at a rate of 1.25 - 1.5 lb/sq.yd. (0.65 - 0.8 kg/m^2).

5. Keep the coating moist for 2 - 3 days misting as required to maintain it in a "green looking" condition. Xypex Gamma Cure may be used to reduce the need for misting in keeping the coating moist during the 2 - 3 day curing period. This completes the repairs.

While some applicators and users of Xypex products will coat over cracks larger than 0.02" (0.5 mm) or even leaking cracks anticipating that they will fully heal without any chipping and repair, Xypex recommends repairing of large or actively leaking areas ahead of the coating. "Actively leaking" implies an identifiable flow of water as opposed to general dampness. Xypex Coatings alone will often repair cracks larger than 0.02" (0.5 mm) and those that are slightly actively leaking but to reduce rework the use of chipping and packing of these areas, as discussed above, is recommended. Contact your local Xypex Technical Services Representative for further information.