

## Sewer Infrastructure Protection

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Over the years we have applied a wide range protective coating systems in manholes and waste water assets, and in that time we have seen a number of protective coating technologies come-in and go-out of fashion. Like a steel chain, coatings are only ever as good as their weakest link, which is why we have recently upgraded the coating material we are applying on waste water assets and manholes.

For us it has always been important to seal and protect the substrate and to deliver long term protection.

The vinyl ester-based technologies we are now applying:

- a) incorporate a low viscosity primer;
- b) adhere tenaciously to seal and protect the substrate;
- c) cure rapidly - using a predictable chemical reaction;
- d) have excellent chemical resistance;
- e) have a low application risk;
- f) include low shrink additives that relieve coating stress (shrinking and cracking); and
- g) are moisture tolerant.

We have no doubt that the vinyl ester coatings will extend asset maintenance (recoating) intervals and thereby deliver substantial long-term savings.

## Understanding sulphide corrosion

Hydrogen sulphide corrosion is a well-known problem in sewers. Hydrogen sulphide (H<sub>2</sub>S) is a colourless gas that smells like rotten eggs. It proliferates in waste slime and algae which is found in sewer networks. The hydrogen sulphide acts as a food source for colonies of Thiobacillus bacteria, which thrive on the gas. The colonies consume the gas and excrete sulphuric acid at acid concentrations as high as 7 percent. In certain cases, particularly where sewers are also handling trade waste, the acid build up can reduce a manhole into crumbly calcium sulphate, or gypsum, which is more like drywall than concrete. The degradation process is known as microbial-induced corrosion, or MIC.

## Protecting Manholes From Sulphide Corrosion

Concrete manholes, lift stations, and other sewer structures are often in need of extensive rehabilitation due to the corrosive effects of high levels of H<sub>2</sub>S.

The rehabilitation process begins with surface preparation. Surfaces are usually prepared by pressure washing, acid etching, hand or power tool cleaning, or any combination of these. The most common method of surface preparation is pressure washing at 4,000-5,000 PSI. Regardless of what method or methods are used, all unsound concrete, contaminants, dirt, and debris is removed before applying a protective coating.

Once the surface is clean the pH of the concrete is checked and if necessary a solution of calcium carbonate is applied to the concrete to lift the pH level of the concrete back to pH 10 – pH13.

A low viscosity 2-pack vinyl ester resin primer is then brushed into the concrete surface to seal and protect the substrate. Applying the primer is critical for preserving the integrity of the substrate. It is also important because most local councils are under-resourced so the old adage, “Out of sight, out of mind” applies. This secondary layer of protection is also critical because in severe environments manholes that are not properly protected can be ruined in just a matter of months.

Once the primer has gelled irregular surfaces can be restored with a fast setting vinyl ester grout which is trowelled on and smoothed with a brush.

After the primer / grout has gelled several coats of vinyl ester resin are either sprayed, brushed or rolled onto the surface. The number of coats to be applied being a function of the condition of the substrate and H<sub>2</sub>S attack.

## **Outstanding Value Proposition**

Using a vinyl ester-based resin solution makes sense because it is not affected by the levels of H<sub>2</sub>S found in manhole and sewerage networks so it will last at least 25 years.

By applying a vinyl ester-based concrete primer the substrate is deep sealed and protected. The primer chemically bonds with the protective coating so there is no chance of any micro-spaces existing under the protective coating.

Unlike magnesium hydroxide and calcium aluminate cement solutions the protective coating will not wash off and it is not affected by H<sub>2</sub>S gasses and sulphuric acid so there is no chance that the substrate will age because of the sewerage environment.

**We do it once and we do it right, using a low risk system that has been proven in even the harshest sewerage environments over a long period of time.**

## **About our Mir-Resin Coatings**

Mir-Resin is Australian owned and Australian manufactured.

Most manholes can be returned to service on the same day.

Every manhole has a written & photo report completed during the inspection & application process, giving the client instant feedback on infrastructure integrity.