

# HYCHEM ADVANCED COATING SYSTEMS

Long term coating solutions  
for water industry assets



HYCHEM ARE CORPORATE MEMBERS OF:



**AUSTRALIAN<sup>®</sup>  
WATER**  
—  
ASSOCIATION



**HYCHEM**  
EPOXY SYSTEMS

## The Hychem TL5 epoxy advantage

Hychem international is an Australian formulator and manufacturer. The Hychem TL5 coating is specifically designed to offer a long term and fast turnaround for all water assets requiring rehabilitation or prevention of corrosion. Protection suited to most water industry structures within the network or facilities across a range of substrate types.

Based on the attached specifications, Hychem can offer long material warranties of 10+ years. The expected design life based on actual case history is 25+ years.

## Background

Hychem TL5 was originally developed in 1995 at the request of Melbourne Water. Locally made in Hychem's head office and manufacturing plant in NSW, Hychem TL5 was formulated to suit Australian conditions. It was specifically designed for long term fast turnaround protection of water industry assets.

Hychem TL5 is a high build solventless epoxy with excellent resistance to dilute sulphuric acid and excellent adhesion and impact strength. The product is typically spray applied at thicknesses from 1mm to 6mm.

## Why coat with epoxy?

Hychem TL5 is both laboratory and field tested over 20 years to prove it will withstand long term exposure to  $H_2S$  and sulphuric acid found in sewerage structures.

Hydrogen sulphide gas is created by microbial degradation of organic matter in an anaerobic environment. This gas is then oxidised to sulphur dioxide when it reaches oxygen rich areas such as manholes and pump stations. The gas dissolves in water and forms sulphuric acid.

Sulphuric acid is highly aggressive to concrete and produces major corrosion damage. The application of Hychem TL5 will prevent and halt damage from this process. Hychem Epoxy will withstand impact damage and hydraulic erosion.

## Collaboration

Hychem TL5 has a hugely successful track record across all of Australia over the last 20 years. The success comes from not only the unique and specialised formulation but also by working closely with experienced applicators.

Hychem understands that the success of any coating system requires careful examination of all criteria and working together with key players. Hychem offers technical assistance at design phase right through to implementation. We work closely with design teams, consulting engineers, water authorities and project managers to ensure a high standard system is applied. Hychem will assist and contribute to work method statements, inspection test plans and conforming with industry standards. This unique approach has set us a side from other manufacturers and has guaranteed our success across the industry.



*Applying Hychem TL5 to a coarse substrate.*



*Manhole coated with Hychem TL5. A six hour turnaround providing 20+ years protection.*



# 20 years of case history

Hychem is routinely applied to both new and damaged structures across the nation. Attached is a list of water authorities where Hychem TL5 has been applied. References are available at request.

Hychem TL5 was used extensively for Melbourne water in the mid 1990s. One of the largest projects at the time was the Spotswood North Drop Structure. This was coated with Hychem TL5 at 2mm in 1995.

Melbourne Water commissioned a coating inspection report from a NACE inspector of the Spotswood drop structure in July 2013 (Report No. 001-13022). The condition of the 17 year old coating surprised the inspector! It was found to be in sound condition in a large percentage of the area with minimal film thickness reduction. The report stated that in the highly aggressive H<sub>2</sub>S locations on the "roof and walls of the shaft the high build coating TL5 is in good condition with no visible cracking, delamination, general break down or deterioration."

Other major installation dating back nearly 20 years were carried out for Barwon water. In 1995 Hychem TL5 was used by Tenix Australia to coat a 300 square metre section of the Geelong outfall sewer for Barwon Water. The 2.4m outfall pipe was coated in Hychem TL5 and it provided excellent protection in a highly aggressive environment. It was recently inspected by a local contractor involved in the original installation who claimed "the coating was in the same condition as when it was installed."

Barwon water issued a report detailing some of the pros and cons of various coating systems. Epoxy, namely Hychem TL5 (super epoc name at the time) were the preferred choice for ease and speed of application and knowledge of longevity without any material loss.

## SACRIFICIAL VS. NON SACRIFICIAL

It was also noted that the sacrificial coatings (Calcium Alumina Cement) were performing as expected and had lost approximately 15mm of coating thickness in a 5 year period (from "Corrosion and Rehabilitation of concrete access chambers, Graham Thompson, Barwon Water).

## PHOTOS AND DESCRIPTION FROM INSPECTION REPORT 2013



*Coating is in sound condition on both the surface and the joins.*



*Roof coating in sound condition. Light surface contamination is seen as dark patches.*



*Walls are in sound coating condition. No visible signs of coating deterioration here.*

## National Industry Standards

- Many approvals through numerous water authorities and councils.
- TL5 approval by SA water through several manhole trials in Adelaide and long term product immersion test.
- Hychem TL5 will conform to the application guidelines set out by Water Services Australia Manual for selection and application of protective coatings WSA 201. TL5 will satisfy the requirements of EUH Epoxy Ultra High Build 5.13.
- Sydney water approval of Hychem TL5 is documented on the Sydney supplement to the WSA 201.
- Hychem TL5 is AS4020 potable water certified.
- University of Technology Sydney passed TL5 for Sydney water Specification 204 (sulphuric acid test, thermogravimetric test, infrared spectroscopy, bond strength).

## Hychem TL5 highlights summary

- ✓ Expert product knowledge and application through collaboration with skilled contractors
- ✓ 20 year case history on Australian water assets
- ✓ Specifically designed for the water industry
- ✓ Manufactured in Australia, supported by technical staff
- ✓ 10 year material warranty
- ✓ Non sacrificial
- ✓ Gloss finish = high flow rate, less friction
- ✓ High acid resistance
- ✓ High caustic resistance
- ✓ Bonds to damp concrete
- ✓ High build application in one session
- ✓ High impact strength
- ✓ Fast return to service (6-8 hours possible)



*Hychem TL5 is applied by specialist equipment and contractors.*

# List of major projects and clients

## WASTE WATER TREATMENT PLANTS

(Including MBR, Inlet Works and Clarifiers etc.)

- Banora Point
- Ballina
- Beenleigh
- Cooloola
- Coombabah
- Elanora
- Evans Head
- Fairfield
- Merrimac
- Pimpama
- Rainbow Beach
- Rosewood
- Taree
- Tamworth
- Tin Can Bay
- Thornside
- Townsville
- Wacol
- Wagga Wagga

## WWTP PUMP STATIONS

- Goodna (9m diameter – 16m deep)
- Logan – more than 15m
- Currumbin, Merrimac, Robina, Chambers Flat
- Gladstone
- Mount Isa

## EMERGENCY OVERFLOW STORAGE TANKS

- Logan
- Gladstone
- Ipswich

## MANHOLES

- Hundreds around Brisbane
- Brisbane Council
- Unity Water
- Sunshine Coast
- Gold Coast CC
- Logan City Council
- Ipswich CC

## FRESH WATER TREATMENT PLANT

- North Pine WTP – Filter Tank

## NATIONAL LIST OF WATER INDUSTRY CLIENTS

- Water Corporation WA
- City Water Townsville
- Simplot Tasmania
- Barwon Water
- Bega Shire council
- Brisbane Water
- Central Highlands Water
- City of Wagga Wagga
- City West Water
- Coffs harbour council
- Gippsland Water
- Gold Coast Water
- Goulburn Murray Water
- Griffith Council
- Hunter Water Corporation
- Lower Murray Water
- Melbourne Water
- Murray Shire Council
- Noosa Shire Council
- Queanbeyan City Council
- Shoalhaven City Council
- South East Water
- South Gippsland Water
- Sydney Water
- Yarra Valley Water
- Wannon Water
- Western Water
- Westernport Water



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# HYCHEM SPECIFICATION

## Water industry



**HYCHEM**  
EPOXY SYSTEMS

## Concrete Waste Water Assets – Existing structures

### PRODUCTS

- Hychem E500P – fast curing penetrative primer
- Hychem E500T – epoxy fairing paste
- Hychem TL5 – high build spray applied chemically resistant coating

### SYSTEM DESCRIPTION

A high build monolithic epoxy system for application to existing concrete structures.

Overall dry film thickness 3 to 6mm.

### SPECIFICATION REQUIREMENTS

A long term (20+ year design life) solution for concrete exposed to constant H<sub>2</sub>S and sulphuric acid attack. Needs to be non sacrificial, high impact with excellent chemical resistance. Ideally suited to a range of damaged existing waste water assets within networks and facilities. TL5 is approved by SA water. System conforms to WSA manual 201, Epoxy Ultra High build (EUH). AS4020 water potable.

### APPLICATION GUIDELINES

#### Preparation

Surface preparation is to be carried out by means of high pressure water blasting at approximately 6-10,000 psi.

The concrete substrate must be firm, clean and dry (damp) with a compressive strength of 25 MPa and a minimum surface tensile strength of 1.5 MPa.

- New concrete must be allowed to cure for a minimum of 28 days.
- Remove all surface laitance, contaminants, existing coatings, curing compounds and any weak or loose materials.
- Prepare the concrete surface to provide the appropriate concrete surface profile (CSP) for optimum mechanical keying.
- The extent of surface preparation required is dependent upon but not limited to the thickness of the coating system to be applied. It is highly recommended surface preparation is carried out in accordance with industry standards and publications such as NACE 02203 item No. 22420 or ICRI Technical Guideline No. 03732.

#### Prime coat

The application of a prime coat is normally unnecessary for existing structures that have been well prepared. If required use Hychem E500P and E500T for any larger repairs. Apply as per Technical Data Sheet.

### HIGH BUILD EPOXY COATING TL5 @ 3-6MM

In most cases, TL5 is applied after preparation straight onto the concrete. Apply Hychem TL5 at approximately 3mm using an airless plural spray machine such as a Graco XP70 or Graco Extreme. A directional spray pattern will be used to achieve a uniform nominal 3 millimetre coating thickness. Increased film depth can be achieved by using wet on wet application technique.

Note: for fast return to service, TL5 SP will be used.

An Inspection Test Plan will need to be implemented to cover at least the following: Product shore hardness, adhesion and film thickness. A full test plan as per WSA 201 ref: table 7.2 is recommended.

For breathing protection during the spray application the operators will wear air fed breathing apparatus.

Refer to Data Sheets for more specific information on application and environmental information.

Application techniques and coverage may vary depending on actual site conditions.

#### Field support

*Field support where provided, does not constitute supervisory responsibility. Suggestions made by HYCHEM either verbally or in writing may be followed, modified or rejected by the owner, engineer or contractor since they and not HYCHEM are responsible for carrying out procedures appropriate to a specific application.*

#### Customer responsibility

*The technical information and application advice given in this publication is based on the best information available at the time of print. As the information herein is of a general nature, no assumption can be made as to the product suitability for a particular use or application and no warranty as to its accuracy, reliability or completeness either expressed or implied is given other than those required by Commonwealth or State Legislation. The owner, his representative or the contractor is responsible for checking the suitability of products for their intended use.*

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# HYCHEM SPECIFICATION

## Water industry



**HYCHEM**  
EPOXY SYSTEMS

## Concrete Waste Water Assets – New structures

### PRODUCTS

- Hychem E500P – fast curing penetrative primer
- Hychem E500T – epoxy fairing paste
- Hychem TL5 – high build spray applied chemically resistant coating

### SYSTEM DESCRIPTION

A high build epoxy system for application to new concrete structures.

Overall dry film thickness 2–2.5mm.

### SPECIFICATION REQUIREMENTS

A long term (20+ year design life) solution for concrete exposed to constant  $H_2S$  and sulphuric acid attack. Needs to be non sacrificial, high impact with excellent chemical resistance. Ideally suited to a range of waste water assets within networks and facilities. TL5 is approved by SA water. System conforms to WSA manual 201, Epoxy Ultra High build (EUH). AS4020 water potable.

### APPLICATION GUIDELINES

#### Preparation:

Surface preparation is to be carried out by abrasive sand blasting with a water ring to reduce dusting or by means of high pressure water blasting at approximately 4–6000 psi.

The concrete substrate must be firm, clean and dry with a compressive strength of 25 MPa and a minimum surface tensile strength of 1.5 MPa.

- New concrete must be allowed to cure for a minimum of 28 days.
- Remove all surface laitance, contaminants, existing coatings, curing compounds and any weak or loose materials.
- Prepare the concrete surface to provide the appropriate concrete surface profile (CSP) for optimum mechanical keying.
- The extent of surface preparation required is dependent upon but not limited to the thickness of the coating system to be applied. It is highly recommended surface preparation is carried out in accordance with industry standards and publications such as NACE 02203 item No. 22420 or ICRI Technical Guideline No. 03732.

#### Prime coat:

The application of at least 1 x coat of Hychem E500P is necessary for new concrete.

Apply E500P with a roller at approximately 4–5m<sup>2</sup> per litre. Recoat within 12 hours, avoid excessive heat, cold and UV.

Depending on the surface finish following preparation and the requirements for the finished surface, any blow holes or imperfections may need to be filled with Hychem E500T fairing paste or an approved Hychem cementitious filler. Apply above as per Technical Data Sheet.

### HIGH BUILD EPOXY COATING TL5 @ 2MM

Apply Hychem TL5 at approximately 2mm using an airless plural spray machine such as a Graco XP70 or Graco Extreme. A directional spray pattern will be used to achieve a uniform nominal 2 millimetre coating thickness.

An Inspection Test Plan will need to be implemented to cover at least the following: Product shore hardness, adhesion and film thickness. A full test plan as per WSA 201 ref: table 7.2 is recommended.

For breathing protection during the spray application the operators will wear air fed breathing apparatus.

Refer to Data Sheets for more specific information on application and environmental information.

Application techniques and coverage may vary depending on actual site conditions.

#### Field support

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# HYCHEM TL5

## High Build Epoxy Coating

DATA SHEET



**HYCHEM**  
EPOXY SYSTEMS

HYCHEM TL5 is a chemically resistant high build epoxy coating designed for use in environments where exposure to alkali and dilute mineral acids is required. HYCHEM TL5 is designed to protect water assets which are subject to sulphuric acid attack caused by microbial degradation of sulphur containing amino acids in sewage. The product is designed for application at a minimum of 1mm and a maximum of 7 mm using a wet on wet spray technique, but can also be trowelled where spray application is unsuitable.

### USE

HYCHEM TL5 is specifically designed for use in:

1. The waste water industry: Pipes, manholes, pump stations, drop structures, detention tanks and treatment plants.
2. The mining industry: Lining of walls in ammonium nitrate storage warehouses.
3. The food industry: Lining of bunds, pits, drains and effluent channels.
4. The petroleum industry: Corrosion protection of both concrete and steel assets.

The product meets Australian Standard AS 4020:2005 TESTING OF PRODUCTS FOR USE IN CONTACT WITH DRINKING WATER and can thus be used in pipelines and storage vessels for potable water.

TL5 is also compliant with the requirements of Sydney Water Standard Specification 204. TL5 conforms to requirements of WSA manual 201 for Epoxy Ultra High Build (EUH)

### FEATURES AND BENEFITS

- Designed to be applied by airless spray unit or by occasional trowel
- Fast cure, early return to service
- High acid resistance
- High caustic resistance
- High solvent resistance
- High fat resistance
- High hydrocarbon resistance
- Good intercoat adhesion using wet on wet technique
- Bonds to damp concrete
- High impact strength

### LIMITATIONS

HYCHEM TL5 is not suitable for use with concentrated sulphuric (98%), 30% plus nitric acid, 20% plus acetic acid and 40% plus phosphoric acid. For exposure to these materials, contact the HYCHEM Technical Department.

### TYPICAL PROPERTIES

Appearance	Resin: White paste, Hardener: Black Paste, Mixed: Grey Paste
Mix ratio	2 parts resin to 1 part hardener by volume
Specific gravity	Resin 1.25, Hardener 1.0, mixed 1.2
Working time @ 20°C	20 minutes
Gel time @ 20°C	30 mins
Tack free time	3-5 hours
Cure schedule @20°C	
4 hour cure	40 Shore D
8 hour cure	60 Shore D
24 hour cure	75 Shore D
7 day cure	75 Shore D
Cured performance	
Compressive strength	65 MPa
Tensile strength	25 MPa
Bond strength	3.8 MPa (concrete failure)
Impact strength	1.47 joules
Intercoat adhesion@24 hours	8 MPa substrate failure

### CHEMICAL RESISTANCE

HYCHEM TL5 is formulated to have good resistance to dilute sulphuric acid. Immersion in the chemical results in a minimal absorption of 1% after 3 months exposure. (EX = Excellent, VG = Very good, G = Good, P = Poor)

ORGANIC ACIDS		MINERAL ACIDS		CAUSTIC MATERIALS		OXIDIZING MATERIALS	
Acetic acid 10%	G	Hydrochloric acid 20%	EX	Sodium hydroxide 20%	EX	Sodium hypochlorite 12%	G
Lactic acid 10%	G	Sulphuric acid 20%	EX	Ammonium hydroxide 20%	VG	Hydrogen peroxide 10%	G
Citric acid 15%	VG	Nitric acid 20%	G				
		Phosphoric acid 20%	G				

SALTS		HYDROCARBONS		OXYGENATED AND CHLORINATED SOLVENTS	
Ammonium nitrate	EX	Unleaded petrol	EX	Acetone	Limited to spillage
Ammonium sulphate	EX	Kerosine	EX	Methyl ethyl ketone	Limited to spillage
Ammonium phosphate	EX	Turpentine	EX	Methylene chloride	P
Sodium chloride	EX	White spirits	EX	Carbon tetrachloride	Limited to spillage
Ferric chloride	EX	Toluene	G		
		Xylene	EX		



## APPLICATION GUIDELINES

### Surface preparation

All organic matter, weak surfaces and poorly consolidated material must be removed. This is ideally carried out by water blasting with equipment delivering 4,000 PSI for new concrete and up to 10,000 PSI for badly deteriorated surfaces.

Cleaned, badly deteriorated surfaces are often ready for coating, providing a natural undulating profile. Cleaned, new concrete surfaces tend to produce a plethora of blow holes which when coated give rise to coating blisters.

Correct treatment of this problem involves a number of issues.

Firstly, coating application must take place when substrate temperatures are falling and must not occur under direct sunlight.

Secondly, visible blowholes can be sealed with a blend of HYCHEM TL5 and quartz aggregate. This can be applied as a surface screed or merely used to plug individual blow holes. Application of the subsequent HYCHEM TL5 should be after the screed has surface hardened and within a total period of 24 hours.

Thirdly, a coat of HYCHEM E500P primer can be used to seal the entire surface should the problem persist. Application in the late afternoon or at night can also be considered.

### Coating application

HYCHEM TL5 must be applied at surface temperatures in excess of 5°C and below 30°C. Air humidity must be below 85% to prevent possible surface whitening due to water condensation which can affect intercoat adhesion when using multiple coats.

Due to the rapid cure and resultant short potlife, it is recommended that the material is applied using a plural component airless spray with static mixing head. Consult your spray unit supplier for detailed specifications.

Applying HYCHEM TL5 to small surfaces such as encountered in manholes is best carried out using a trowel. The application of a thin first coat, using a resin mortar mix is recommended. This reduces shear adhesive stresses and blow holes.

The surface finish can be improved by rolling with a slightly damp short nap mohair roller.

### Coverage and spread rate

With correct choice of equipment, the coating can be applied at 65 sqm/hour at a coating depth of 3mm, using a volume output of 200 litres/hour.

### Inspection

Coating deficiencies should be quality controlled with a Holiday Tester and deficient areas cut out and resealed with a trowelled application of HYCHEM TL5.

Adhesion to be tested periodically after cure, using a suitable tensiometer such as an Elcometer.

As it is possible for the mixer to lose the correct mixing ratio, the coating should be periodically tested for hardness using a Shore D Hardness meter as well as a visual colour inspection.

## HEALTH AND SAFETY INFORMATION

Part A: Irritating to eyes and skin.

Part B: Harmful by inhalation in contact with skin and if swallowed. Causes severe burns. Risk of serious damage to eyes. May cause SENSITISATION by skin contact. Harmful to aquatic organisms may cause long-term adverse effects in the aquatic environment. Vapours may cause drowsiness and dizziness.

If this product comes in contact with the eyes, immediately hold eyelids apart and flush the eye continuously with running water. If skin or hair contact occurs immediately wash thoroughly with soap and water. In case of accident or if you feel unwell IMMEDIATELY contact doctor or Poisons Information Centre (show label if possible).

### CLEAN UP

Clean equipment with epoxy diluting solvents such as Xylene. Hard, cured material will need to be mechanically removed. Use soap and water to wash hands.

### PACKAGING

HYCHEM TL5 is available in 60 litre and 600 litre packs.

## SAFETY INFORMATION

Epoxy resin products are skin sensitizing and can have a caustic reaction. Wear protective gloves, clothing and protective eyewear when using. Wash hands before eating and avoid breathing vapours.

### Disclaimer

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