

TECHNICAL STANDARD**TS 137 - Rehabilitation of Concrete Wastewater
Manholes**

Issued by: Manager Engineering

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Approval may be granted by the Asset Owner to deviate from the requirements as stipulated in this Standard if the functional requirements (e.g. Asset Life) for the asset differs from those stated in the Standard, but is assessed as still being acceptable by the Asset Owner's nominated representative.

Any approval to deviate from the stated requirements of this Standard will not be seen as creating a precedent for future like project. Any request to deviate from this Standard must be carried out on a project by project basis where each alternate proposal will be individually assessed on its own merit.

MAJOR CHANGES INCORPORATED IN THE APRIL EDITION

The following lists the major changes to the April edition of TS 137, which have been incorporated in this edition:

1. Inclusion of new approved products Futurathane 5041 and International Polibrid 705-E in the December 2011 version of TS 137.
2. Alteration of approved Calcium Aluminate Cement (CAC) supplier.
3. Alteration of CAC application section.

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Referenced Documents

SA Water Technical Standard TS 3(c)
 AS 2865-2009

Section 1: Scope

The scope of this technical standard covers the surface preparation and rehabilitation of SA Water concrete wastewater manholes using approved coating and lining materials. The following products are approved for use under this technical standard:

- Calcareous aggregate concrete complying with SA Water technical standard TS 3(c)
- Calcium Aluminate Cements (CAC) such as Kerneos Sewpercoat, Parchem Sewpercoat or equivalent.
- Futura-thane 5041 Polyurea Elastomer or approved equivalent.
- International Polibird 705 – E solventless elastomeric polyurethane.

Note: Equivalent products need to be reviewed by SA Water's Materials Sciences prior to being accepted.

SA Water is continuously testing new products and suitable products will be included in future revisions of this technical standard.

Section 2: Contractor and Quality Assurance

The contractor shall submit, to SA Water's Representative, documentation in accordance with their quality assurance plan. All quality control records shall be available for inspection by SA Water's representative.

A work method statement shall be submitted to SA Water's representative prior to commencement of works.

2.1 SA WATER'S REPRESENTATIVE

SA Water's representative in this Technical Standard will be nominated by SA Water.

Section 3: Instructions on Supply of Materials

Materials used shall be those specified within this standard. Certification from the material supplier shall be sought to ensure only specified materials are used.

Section 4: Safety and Environment

The contractor shall conduct the operations in accordance with the standards laid down in the *South Australian Occupational Health, Safety & Welfare Act* and all regulations there under.

All operations conducted outside the state of South Australia shall meet all local safety and environmental requirements.

Contractors are responsible for obtaining all necessary approvals and disposal of all waste.

Contractors are obliged to comply with requirements outlined in AS 2865-2009 for confined space entry.

Contractors shall ensure that the atmosphere in the manhole is safe for works to be undertaken.

Applicators are to wear appropriate personal protective equipment (PPE) as recommended in the manufacturers material safety data sheets (MSDS) and technical data sheets (TDS).

Section 5: Surface Preparation

5.1 GENERAL

Deteriorated concrete surfaces shall be cleaned of all loose and lightly adherent concrete and corroded concrete by-products until sound, highly alkaline concrete has been reached. All removed concrete and debris shall be collected and removed from the manhole so that no debris enters the sewer. In addition to this, prepared surfaces shall be tested for alkalinity using either phenolphthalein indicator or a similar pH indication method. A pH greater than 9 is required.

Surfaces shall be prepared by high pressure water cleaning to a maximum pressure of 5000 psi to removed all deteriorated concrete by-products and surface contaminants. Approval from SA Water's representative shall be sought should the contractor wish to increase the water blasting pressure beyond 5000 psi.

Deteriorated concrete shall be cleaned back to provide both a roughened key for the new lining to adhere to, and to also reach a highly alkaline surface.

In addition to the above requirements, when using International Polibrid 705-E, following high pressure water blasting, abrasive blasting of the concrete surface should be undertaken to provide a sound substrate with a roughened texture resembling course sand paper (50 – 60 grit).

If concrete reinforcement is exposed, SA Water's representative shall be notified prior to the application of lining to determine a further course of action.

Section 6: Application of Lining

6.1 GENERAL

Linings shall be applied in accordance with Manufacturer's recommendations and to the satisfaction of SA Water's representative.

6.1.1 Application of Calcareous Marble Aggregate Mortar Complying with TS3(c)

Mortar may be applied by either hand trowelling or by wet shotcrete onto the prepared surfaces. Following adequate lining thickness being achieved, surfaces shall be trowelled smooth.

6.1.2 Application of Calcium Aluminate Cement (CAC)

Application of CAC shall be in accordance with manufacture's recommendations.

6.1.3 Application of Futura-Thane 5041

Application shall be in accordance with the manufacturer's recommendations.

The prepared surface shall be primed with Futura Bond 316 (Rough concrete surfaces may require the application of Futura Bond 320 gel prior to the application of Futura Bond 316.)

Following priming, application of the Futura-Thane 5041 shall be by spray, using a heated plural component airless spray system only, which is 1:1 ratio capable and produces a minimum delivery rate of 4.75 litres per minute with a tip pressure of 2600 – 3000 psi. Applicators shall pay strict attention to the required equipment for application. Equipment shall be in accordance with manufacturer's recommendations.

The coating shall be applied at a minimum dry film thickness of 5 mm and up to a maximum dry film thickness of 10 mm.

6.1.2 Application of Polibrid 705 – E

Application of Polibrid 705-E shall be in accordance with the manufacturer's recommendations.

Any holes or voids in the prepared concrete shall be filled with Interseal 1036 in accordance with International Protective Coatings recommendations prior to priming and geotextile application.

Following this, the surface shall be primed with a layer of Polibrid 705-E with a wet film thickness of 500 microns. Whilst this layer is wet, a geotextile fabric shall be embedded into the wet coating and laid off evenly ensuring no lumps or air bubbles remain under the geotextile. This should be done using a roller and care should be taken to ensure that the geotextile is not saturated into the Polibrid.

Following embedment of the geotextile, a top coat of Polibrid 705 – E with a minimum thickness of 2000 microns dry film thickness shall be applied.

Section 7: Inspection

7.1 GENERAL

Following application and while the film is still wet, an inspection of the reinstated lining shall be undertaken to ensure the lining has been applied in accordance with section 6.

SA Water's representative may attend the work site at any time to verify that the requirements of this standard are met.

An inspection report shall be completed and delivered to SA Water's representative following inspection.

7.1.1 Inspection of Calcareous Marble Aggregate Mortar Complying with TS3(c)

The reinstated surface shall be tested for thickness by testing that the wet film thickness of the applied lining is in accordance with the required thickness of the lining.

7.1.2 Inspection of Calcium Aluminate Cement (CAC)

The reinstated surface shall be tested for thickness by testing the wet film thickness of the applied lining is in accordance with the required thickness of the lining.

7.1.3 Inspection of Futura-Thane 5041

Inspection of the applied Futura-Thane 5041 shall be undertaken by an Australasian Corrosion Association (ACA) or National Association of Corrosion Engineers (NACE) certified coating inspector. Following application and when the coating has achieved full cure, high voltage continuity testing shall be conducted in accordance with AS 3894.1 "Method 1: Non-Conductive Coatings – Continuity Testing – High Voltage (brush) method."

7.1.2 Inspection of Polibrid 705-E

Inspection of the applied Polibrid 705-E shall be undertaken by an Australasian Corrosion Association (ACA) or National Association of Corrosion Engineers (NACE) certified coating inspector. Following application and when the coating has achieved full cure, high voltage continuity testing shall be conducted in accordance with AS 3894.1 "Method 1: Non-Conductive Coatings – Continuity Testing – High Voltage (brush) method."

Section 8: Reinstatement of Damaged Lining

Should any areas require reinstatement of lining, surfaces shall be re-prepared in accordance with section 5 and the lining be reapplied in accordance with section 6.