



WATER SERVICES
ASSOCIATION OF AUSTRALIA

INDUSTRY STANDARD

FOR ALKALI ACTIVATED BINDER INCLUDING
GEOPOLYMER CEMENT MORTAR USED FOR
THE RENOVATION OF WASTEWATER
STRUCTURES AND LARGE DIAMETER PIPES

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About WSAA

The Water Services Association of Australia (WSAA) is the peak industry body representing the urban water industry. Our members provide water and sewerage services to over 24 million customers in Australia and New Zealand and many of Australia's largest industrial and commercial enterprises.

ACKNOWLEDGEMENT OF COUNTRY

The Water Services Association of Australia acknowledges and pays respect to the past, present and future Traditional Custodians and Elders of this nation. We recognise their continuing connection to land and waters and thank them for protecting our waterways and environment since time immemorial.

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PREFACE

This Standard was prepared by the Water Services Association of Australia (WSAA).

The objective of this Standard is to provide performance requirements for the application of alkali activated cement including one-part geopolymers cement mortar, used for the renovation of non-pressure wastewater structures such as maintenance holes, wet-wells, tanks, pits, chambers, culverts, treatment plants and large diameter pipes (sized for personnel entry).

NOTE: Products complying with this Standard may also be suitable for the renovation of drainage pipes used for other applications such as stormwater. Design and installation requirements are covered by *WSA 201 Manual for Selection and Application of Protective Coatings*.

An excel-based tool has been developed in order to assist the water industry in establishing in what sewer conditions a liner can be applied effectively and how long it can be expected to last. This tool, the Sewer Rehabilitation & Prioritisation Decision Platform, is available via [email request](#). A fact sheet with additional details is available [here](#).

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FOREWORD

This Standard addresses the material and performance requirements of materials and finished products used in the renovation of wastewater pipelines, or structures, by the application of alkali activated cement including one-part geopolymers cement mortar. It is intended to provide manufacturers and specifiers with a means of demonstrating fitness for purpose.

This Standard differs from those applicable to conventionally installed piping systems in that it is required to verify certain characteristics of the components as manufactured as well as in the installed condition. In accordance with ISO terminology these have been identified as the “M” stage for the collective materials used to fabricate the liner and the “I” stage for the liner as installed.

The service life of products conforming to this Standard will be dependent upon the condition of the host pipe, or structure, the quality of the liner material and its application and the service conditions. The material and process selection shall therefore be in accordance with the requirements of the asset owner with respect to extending the service life of the host pipeline, or structure. Liners shall meet the compositional and material property requirements including elemental and mineralogical analysis of both the cement and aggregates. Use of supplementary and admixture materials needs to be declared. All materials are required to meet the performance requirements of this Standard.

As part of its product appraisal process, WSAA may request details of previous successful installations or require contractors to undertake trial installations. Such trial details may include:

- the type and size of structure renovated;
- service conditions, e.g. temperature, relative humidity, CO₂ and H₂S concentrations;
- the lining material and applied thickness;
- application method(s) and equipment used, e.g. trowel applied, sprayed;
- the cure time between the application of the liner and the restoration of the service;
- methods and equipment used to verify the quality of application;
- contractor details and date of installation; and
- where relevant, details of any subsequent rectification work applied to the renovation.

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies the performance requirements and test methods for in-situ application of alkali activated cement including one-part geopolymer cement mortar spray linings for use in the renovation of non-pressure wastewater structures such as maintenance holes, wet-wells, tanks, pits, chambers, culverts, treatment plants and large diameter pipes (sized for personnel entry).

The standard is applicable to alkali activated cement including one-part geopolymer cement mortar applied as a spray lining or hand-trowelled to concrete and masonry structures in accordance with the WSAA code of practice *WSA 201 Manual for the selection and application of protective coatings*. The principal intent of applying such a liner is to extend the service life of the structure by providing corrosion protection in sewer conditions.

Geopolymer cement mortar can be supplied as one-part geopolymers or two-part geopolymers. One-part geopolymers are supplied as a dry powder in bags and only require the addition of water, i.e. the activating agent is pre-mixed into the powder. Two-part geopolymers consist of a dry powder and a liquid activating agent that require mixing, as well as the addition of water. The water industry has focused on one-part geopolymers due to the advantages in transportation and mixing offered.

An excel-based tool has been developed in order to assist the water industry in establishing in what sewer conditions a liner can be applied effectively and how long it can be expected to last. This tool, the Sewer Rehabilitation & Prioritisation Decision Platform, is available via [email request](#). A fact sheet with additional details is available [here](#).

1.2 CONFORMITY REQUIREMENTS

Methods for demonstrating conformity with this Standard shall be in accordance with Appendix A.

Product certification, when required, shall be undertaken in accordance with WSA TN-08.

Note: The word 'shall' is used in this Standard to designate a mandatory requirement. 'Should' indicates a recommendation.

1.3 LIMITATIONS

This standard considers the application of alkali activated cement including one-part geopolymer cement mortar products in relation to their corrosion resistance properties. Structural repair of wastewater assets using geopolymer cement mortar is beyond the scope of this standard.