HYCHEM® INFRASTRUCTURE

# GeoCast Geopolymer Mortar - WA

## Product Description

GeoCast Geopolymer is a single component, dry packaged, polymer–modified structural mortar with microsilica geopolymer, pozzolan, flyash and select admixtures. It is specifically designed for horizontal, vertical and overhead surface repairs in reinforced concrete and brick pipes, corrugated metal pipe inverts (CMP) and arches, sewer manholes and (water) wastewater structures. The GeoCast Geopolymer withstands hydrogen sulfide ($H_2S$) corrosion. GeoCast offers high early strength and long-term durability.

## Approvals

- In compliance to AS/NZS 4020:2018.
- Appraised by WSAA (Appraisal No. PA 2503)

## Description

A Sustainable Green Technology Product made from over 90% of Australian raw materials, the GeoCast Geopolymer originates from the Reliner MSP® Cement co-patent technology being used in gunned shotcrete coating applications, existing construction rehabilitation, low-pressure spraying renewal and centrifugally [spin] cast applications.

## Areas of use / Applications

- Applications to 100mm thicknesses overhead. (Multiple passes (4-5) will be required - sufficient cure of previously placed material required).
- Stops water infiltration in pipes, tunnels, manholes, wet wells, raw water filtration, bridges, dams, and treatment plant structures such as, Open tanks, enclosed tanks, bungs, floor/ wall repairs.
- Adds long term performance, tenacious bond and lower permeability.
- Formulated with freeze thaw durability advantages on demand.
- Provides high compressive, flexural and tensile strength.
- Actively adheres to damp concrete.

## Protection Levels

### Corrosion Resistance

GeoCast Geopolymer protects against corrosion, [MIC] hydrogen sulfide gas ($H_2S$), sulfates, salt water, chlorides, water vapor, grease and acids to pH 2.0 (ASTM C267).

### Chemical Composition

GeoCast Geopolymer differs significantly from ordinary Portland cement and will not corrode or attack the reinforcing steel. The Geopolymer structural mortar contains microsilica powder admixture, polymer modifiers, polypropylene fibers and flyash that work together to produce a silica rich paste with increased abrasion resistance and reduced cracking.

## Yield

Each 20kg bag will  yield approximately 10.8 litres of mixed material.



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## Properties

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| **Compressive Strength ASTM C109** | 28 days (63MPa) |

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| **Compressive Strength AS 1012.9** | 1 day (35.5 MPa)<br>28 days (84 MPa) | **Applied Density (28 days)** | 2138 kg/m³ |
| **Tensile Strength AS 1012.10** | 6.4 MPa | **Sulfate Resistance – 90 days:**<br>**ASTM C 267**<br>**2,000 ppm (sulfuric acid)**<br>**20,000 ppm (sulfuric acid)** | Good<br><br>Slight Scaling |
| **Flexural Strength AS 1012.11** | 7.0 MPa | | |
| **Bond Strength ASTM C882 - (Slant sheet test)** | 20.2 MPa | | |
| **Bond Strength to Concrete** | | **Chloride Permeability AASHTO T 277** | <100 |
| **Modulus of Elasticity AS 1012.17** | 28 GPa | **Drying Shrinkage (% change) ASTM 596** | -0.178 |

**Note: All tests were carried at 22°C ± 2°C until the age of the test. All the above test results are independent third-party test results. Copies of these test results are available on request.**

## Application Instructions

### Preparation

The concrete substrate must be firm, clean, and dry with a minimum compressive strength of 25 MPa and a minimum surface tensile strength of 1.5 MPa. Remove all surface laitance, contaminants, existing coatings, curing compounds, and any weak or loose materials. Organic matter, weak surfaces, and poorly consolidated material should be removed, ideally by water blasting with equipment delivering a minimum of 5000 psi with a turbo nozzle. Pre-saturate the concrete substrate (SSD) before applying GeoCast. If the concrete structure is exposed to direct sunlight, pre saturating may need to be done for 24 hours prior to application of GeoCast. (Duration of pre saturation may vary due to other on site conditions and constraints). It is important that no running water is present on the substrate when applying GeoCast. Exposed steel reinforcement should be prepared and be free from loose rust and scale. This can be achieved by a mechanical method, such as wire wheel or abrasive blast. Once adequate preparation has been achieved apply Velosit CP201 corrosion protection slurry to prepared steel only, with best practices used to not coat the concrete substrate. (Refer to TDS details).

### Application

Mix one 20kg bag of GeoCast with 2.5L to 2.8L of clean potable water and should be regularly monitored and adjusted accordingly pending on site conditions. Use a large paddle mixer and drill at low rpm to mix until the material is lump-free and homogeneous, approximately 3 minutes. Apply GeoCast by hand troweling at a minimum thickness of 15mm, working it into the concrete to consolidate and until smooth (only if full thickness is achieved). For greater thicknesses, apply GeoCast in layers, allowing approximately 2.5 hours (site dependent) for sufficient curing before applying additional layers. Between passes it is imperative to scratch coat the previously applied GeoCast to create a rough surface for the extra layers – It is recommended that care is taken when applying multiple passes on overhead applications and more weight added to curing material may cause delamination. GeoCast can also be applied by Wet or Dry spray application. Pumping hoses should be kept out of direct sunlight and protected / kept cool during the pumping process. Follow preparation and mixing guidelines and contact a Hychem representative for pump recommendations. Ensure the temperature at the time of application is between 5°C and 35°C and take precautions against winds and draughts to prevent rapid drying and cracking. Apply curing procedures as soon as possible.

### Curing

A curing agent can be applied to GeoCast once the application is completed, although it is not essential in sewer manholes due to the high humidity within the chamber. If a curing agent is used, it must not be applied between layers and should only be used after the final finish.



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## Return to Service

Assets where GeoCast has been used are recommended to be kept offline for a minimum of 7 days to allow GeoCast sufficient time to cure. If protected and precautions are put in place to ensure correct curing procedures are undertaken, then the Geopolymer material should reach approx. 70% of its ultimate strength during this period enabling the asset to return to service.

## Technical Service

Please contact Hychem for any technical advice or guidance.

## Storage

Store in a dry, cool environment, maintaining the original packaging. If the pre bagged material (GeoCast) is exposed and unable to be kept undercover, further protection should be used to prevent damage, contaminants and moisture. Ensure this product is kept out of the reach of children.

## Safety

**Caution: May cause eye and skin irritation.**

Clean up with soap and water. Avoid prolong exposure. Wash with water immediately after handling. If skin problems arise, flush with water and get medical help. Correct PPE must be worn as per installing contractors SWMS.





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