HYCHEM® INFRASTRUCTURE

GeoCast Geopolymer Mortar

Product Overview

Engineered for All Climate Conditions

GeoCast Geopolymer is an advanced, single-component, dry-blended structural mortar co-formulated and engineered by Hychem to perform reliably in all environmental and climatic conditions including high-heat zones, cold climates, arid inland regions, coastal environments, and tropical regions.

Developed using a proprietary combination of microsilica-based geopolymer, pozzolanic materials, fly ash, and specialised admixtures, this polymer-modified mortar provides high-performance rehabilitation of critical infrastructure while delivering inherent

non-combustibility, making it suitable for enclosed, high-temperature, and fire-sensitive environments (limitations apply). GeoCast Geopolymer is designed for horizontal, vertical, and overhead placement and is ideally suited for structural rehabilitation of:

- Reinforced concrete and brick pipelines
- Corrugated metal pipes (CMP)
- Sewer manholes and chambers
- Water and wastewater treatment structures

The formulation provides high early compressive strength, long-term structural integrity, and exceptional durability. Its chemistry offers strong resistance to hydrogen sulfide (H_2S) corrosion (subject to site-specific exposure conditions). As GeoCast Geopolymer is a non-combustible inorganic mortar – it will not ignite, support fire, release smoke or toxic fumes.

Approvals

- Independently tested and certified to **AS/NZS 4020:2018** (Potable Water)
- Non-combustible mineral-based formulation suitable for confined space infrastructure
- Engineered / designed in alignment with international rehabilitation standards and calculations – ASTM F1216.
- Appraised by WSAA (Appraisal No. PA 2503)

Description

As a next generation geopolymer lining solution, GeoCast combines structural performance, non-combustibility, chemical resistance, and climate stability to deliver long-term durability across water, wastewater, stormwater, and industrial service environments, with specific suitability for culverts where abrasion, scour, hydrogen sulphide exposure, and hydrostatic pressure variations demand a high-performance, chemically resistant repair and lining system.

Areas of use / Applications

• Structurally relines pipes, culverts (steel and concrete structures) in accordance with engineered calculations, delivering long term load bearing performance and asset rehabilitation.

• Overhead applications up to 100 mm thick – Achievable through multiple passes. Each layer must be allowed to sufficiently cure before the subsequent coat is applied.

• Stops active water infiltration in underground and above ground assets including pipes, culverts, tunnels, manholes, wet wells, raw-water filtration structures, bridges, dams, and treatment plant infrastructure (e.g., open tanks, enclosed tanks, bunds, and floor/wall repairs).

• Delivers long term durability through a tenacious bond to the substrate and significantly reduced permeability.

• Engineered for freeze thaw resistance, offering enhanced durability in cyclic environmental conditions.

• Provides high compressive, flexural, and tensile strength, suitable for structural and non-structural reinstatement.

• Actively bonds to damp, properly prepared concrete, enabling application in environments where complete drying is not achievable.

HYCHEM®
Head Office: 1/30 Bluett drive
SMEATON GRANGE NSW 2567
PH: 1300 HYCHEM
WWW.HYCHEM.COM.AU

GeoCast Geopolymer Mortar

Protection Levels

Corrosion Resistance

GeoCast Geopolymer is engineered to withstand prolonged exposure to elevated H_2S environments and protects against corrosion caused by MIC, hydrogen sulfide gas (H_2S), sulfates, salt water, chlorides, water vapor, grease, and acids down to pH 2.0 (ASTM C267)

- Please see your Hychem representative for acceptable exposure levels.

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.
Estimating Coverage – 1x bag (20kg) = 10mm thickness per m2. (excluding wastage)

Packaging

20kg bags (50 per pallet), 1000kg (bulker bags)

Properties

Compressive Strength ASTM C 109	24 hours	7 days	28 days
	22 MPa	54 MPa	63 MPa
Tensile Strength ASTM C496			4.7 MPa
Flexural Strength ASTM C293			11.5 MPa
Bond Strength ASTM C882			20.2 MPa
Modulus of Elasticity ASTM C496/ C469M			>31 GPa
Drying Shrinkage (% change) ASTM 596			-0.178
Chloride Permeability ASTM C1202			<300 (very low)
Sulfate Resistance – 90 days (ASTM C 267) 2,000 ppm (sulfuric acid) 20,000 ppm (sulfuric acid)			Good Slight Scaling
Applied Density (28 days)			2100 kg/m³

Application Instructions

Preparation

Steel Assets

Proper surface preparation is critical to ensure structural performance and long-term corrosion protection when applying GeoCast to steel substrates. As part of the preparation process, a combination of high-pressure water blasting (approximately 4,000 psi) and high-pressure air is recommended to remove rust, mill scale, flaking coatings, potential bond breakers and all surface contaminants.Any delaminated or structurally compromised steel must be removed, repaired, or reinstated prior to application. The appropriate method will be determined by project specific requirements, constraints, and engineering guidance.

HYCHEM
Head Office: 1/30 Bluett drive
SMEATON GRANGE NSW 2567
PH: 1300 HYCHEM
WWW.HYCHEM.COM.AU

GeoCast Geopolymer Mortar

Concrete Assets

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 approximately 5000 psi. Pre-saturate the concrete substrate (SSD) before applying GeoCast. If the concrete structure is exposed to direct sunlight, pre saturating may need to be carried out for 24 hours prior to application of GeoCast. (duration of pre saturation may vary due to other onsite conditions and constraints). It is important running water is diverted or mitigated prior to 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)

Hand Application/ Patching

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 onsite 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 trowelling 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.

Wet Spray

Pending pump size/ capacity it is recommended that mixing be limited to 200kg's per mix (10x 20kg bags, 200kg's from a super sack or weighed using a distributer silo. Mix GeoCast using 25L – 28L of clean potable water, adjusting as required to suit onsite conditions. The water content should be regularly monitored and modified to ensure proper consistency.

Curing

A curing agent may be applied to GeoCast once the final application is complete, as it can help protect the material from windinduced moisture loss on exposed surfaces. In most enclosed environments it is not typically required due to the naturally high humidity present. If a curing agent is used, it must only be applied after the final layer has been installed and finished and must not be applied between successive GeoCast layers.

Recommended curing compound: FasTrac CS309 WB or approved equivalent.

Combustibility

GeoCast is not considered combustible.

- NFPA / HMIS flammability rating = 0 (no fire hazard)
- Flash point: None
- Unusual fire & explosion hazards: None

The product itself is a microsilica geopolymer mortar made from inorganic binders (microsilica, fly ash, pozzolans, etc.) with some polymer modification and polypropylene fibres. Those organics are minor and don't turn it into a combustible product. GeoCast doesn't present combustibility issues and behaves like other cementitious/geopolymer mortars (i.e., essentially noncombustible, no contribution to fire load).

Testing

50mm x 50mm steel cube molds should be used for testing – In accordance with ASTM C109 at the specified curing intervals (typically 24 hours, 7 days, 28 days).

HYCHEM
Head Office: 1/30 Bluett drive
SMEATON GRANGE NSW 2567
PH: 1300 HYCHEM
WWW.HYCHEM.COM.AU

GeoCast Geopolymer Mortar

Storage

Store in a dry, cool environment, maintaining the original packaging. 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.

- Refer to the manufacturer's safety data sheet for complete details.

Technical Service

Please contact Hychem for any technical advice or guidance.

HYCHEM
Head Office: 1/30 Bluett drive
SMEATON GRANGE NSW 2567
PH: 1300 HYCHEM
WWW.HYCHEM.COM.AU