Technical Data Sheet

BluCem ZeoGlass

ACID RESISTANT SHOTCRETE CONTAINING RECYCLED AGGREGATE

BluCem ZeoGlass is a one component cement powder which requires only the addition of water to form an acid resistant structural mortar.

BluCem ZeoGlass is a sprayable, high build product suitable for civil engineering applications. BluCem ZeoGlass incorporates specially graded recycled glass aggregates and advanced cement technology to form a cementitious mortar with low drying shrinkage, high alkalinity, excellent acid resistance and high strength.

Application Advantages

- Ultra high build in one pass
- Negligible rebound
- Fast application
- Minimal dust emission
- Easy to hand trowel

Lifecycle Advantages

- Uses >50% recycled raw materials
- Low drying shrinkage
- High acid resistance
- High compressive and bond strength
- High flexural strength

About the Product

BluCem ZeoGlass had been developed using a blend of carefully selected recycled glass aggregates combined with our cementitious material to form the basis of this very dense, high build inorganic polymer structural sewer mortar. The selected aggregates are custom graded by Bluey Technologies to create maximum interlocking during dry spraying to build depths of several hundred millimetres in one pass, creating a strong and highly resistant structural repair mortar. BluCem ZeoGlass is an economical high-performance product with high acid resistance and is suitable for structural repairs in sewers and waste water environment.

Application Solutions

- Concrete protection
- Concrete repair
- Structural repairs of beams
- Columns and slabs
- Structural sewer repairs
- Floor repair and topping
- Water treatment plants

Project Specification Clause

ACID RESISTANT SHOTCRETE - The concrete repair cementitious mortar used for this project shall be a one component cement powder which requires only the addition of water to form a recycled inorganic polymer mortar. It shall be a pre-blended product that has independent testing to validate the performance outlined in the technical data table on the following pages. BluCem ZeoGlass manufactured by Bluey Technologies or equivalent shall be accepted. Refer to complete specification clause on page 4.

Project Examples

Sewer repair and lining, airport construction, bridge repair, building repairs, dam construction and repair, jetty construction and repair, concrete structures, rail construction, rail repairs and shutdowns, retaining walls, sea wall repair and maintenance, tunnel lining, tunnel rock support, wharf repair and construction.

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Application Specification

CONCRETE PREPARATION

1.1 All defective host substrate must be removed prior to application. Defective material includes cracked or structurally weakened surfaces and also chloride contaminated and carbonated concrete. A concrete corrosion expert must be consulted for critical projects or structural applications.

1.2 Host concrete must be roughened and aggregate exposed to ensure good bond. Removal of laitance is important to ensuring good bond. Shot-blasting, scarification, mechanical chipping or high pressure water blasting may be used to achieve a recommended minimum >CSP 6 surface finish, this is for existing structures. For new concrete structures, contact Bluey Technical team for recommendation of surface preparation.

. The correct balance between roughening the surface and not causing further micro-cracking and damage should be trialled and assessed.

1.3 All surfaces must be free of dust, oils and surface contaminants. This may require steam cleaning or high pressure water blasting.

1.4 A perimeter edge of at least 10mm depth must be provided around the area for application.

1.5 Priming using BluCem AP10 is recommended. Priming by saturation of the surface using water prior to application is also acceptable. Priming with epoxy primers or other products which prevent vapour transmission is not recommended.

STEEL PREPARATION

2.1 Following removal of all defective concrete, any partially exposed reinforcing bars shall be fully exposed to a depth of 20mm behind the bar.

2.2 If the bar has lost more than 20% of its original diameter then it should be replaced and the Structural Engineer must be consulted.

2.3 Where the original reinforcement is retained it must be cleaned to a standard surface purity of Sa 2.5 for chloride contaminated concrete and Sa 2.0 for carbonated concrete. This is best achieved by wet blasting or abrasive blasting.

2.4 If chloride contamination is present then high pressure wet blasting is the only acceptable method of cleaning. Priming of reinforcement is generally not required.

2.5 If the steel will be exposed to the atmosphere for several days after cleaning then an acceptable form of priming would be to mix GP cement into a slurry using BluCem AP10 and apply a cement rich coating to the steel surface.

MIXING

3.1 For wet applications, add BluCem ZeoGlass to potable water in a clean vessel using a high shear mechanical mixer for at least three minutes. Do not mix more material than can be placed in 30 minutes. Add enough water to achieve the desired consistency within the water ratio limits specified in this data sheet.

3.2 For dry applications, empty the dry powder directly into the hopper and adjust water and air at the nozzle for suitable consistency.

PUMPING

4.1 Special pumping and mixing equipment are required for BluCem ZeoGlass which can be applied by either wet or dry spraying. Various models of batch mixers and continuous mixers are available for use. It is important to match your application's specifics with the capabilities of the mixer and pump. Bluey Technologies are able to recommend the right mixer for your project.

4.2 For wet spraying applications rinse the mixer and charge the pump hopper with sufficient water to flush and cool the pump and all grout lines thoroughly. Check to ensure that all lines and hoses are clear and unobstructed. Once grout is mixed, it is important to keep it agitated continuously prior to pumping.

4.3 Following completion, dispose of excess production material in consideration of the environment. Carefully wash out machinery and surrounding areas.

APPLICATION TEMPERATURES

5.1 As with the water temperature, the higher the air temperature the more quickly the grout hydrates and sets. Bluey Technologies specify mixing times and set times at an ambient temperature of 20°C. These times vary with temperature fluctuations, and adjustments will be required to compensate for this. Exposing the pumping hoses to the sun on a hot day accelerates the product's set time.

CURING

6.1 It is recommended that the final surface finish layer is coated with curing compound or otherwise maintained wet for at least three days.

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Product Data

Please refer to Important Notice on the last page

Packaging	20kg, 1000kg, 1200kg
Water Addition	2.0 - 3.0 litres per 20kg bag
Yield	9.8 litres per 20kg @ 13% water
Build Scope	Up to 300mm in one pass vertical; up to 150mm in one pass overhead
Workability Time	30 minutes @ 20°C
Maximum Particle Size	3.0mm

TESTED CHARACTERISTIC	STANDARD	RESULT
Compressive Strength	AS1478.2 Appendix A	11% water 50MPa @ 24 hours 70MPa @ 7 days 80MPa @ 28 days 90MPa @ 56 days 13% water 40MPa @ 24 hours 55MPa @ 7 days 65MPa @ 28 days 75MPa @ 56 days
Flexural Strength	AS1012.11	6.1MPa @ 13% water
Modulus of Elasticity	AS1012.17	34.0GPa
Chloride Ion Diffusion	NORD Test Method NT Build 443	3.25E-12m^2/sec @ 11% water
Bond to Substrate	EN1542:1999	2.6MPa @ 11% water*
Drying Shrinkage	AS1478.2 Appendix B	390μstrain @ 7 days @ 11% water 500μstrain @ 28 days @ 11% water 570μstrain @ 56 days @ 11% water
Setting Time	AS1012.18	Initial set - 190 minutes Final set - 280 minutes
Fresh Wet Density	AS1012.5	2200kg/m^3 @ 13% water
Potable Water Applications	AS/NZS 4020	Certified
ACCELERATED AGEING TESTS**		
Ammonia Sulphate Solution (1500ppm) **@ 20°C** **@ 38°C** **@ 60°C**	Test on samples made from ZeoGlass cement binder only	No detrimental loss of chemical or physical properties under XRD analysis
Ammonia Sulphate Solution (1500ppm) **@ 20°C** **@ 38°C** **@ 60°C**	Test on samples made from ZeoGlass cement binder only	No loss of of compressive strength @ 28 days >50MPa >50MPa >50MPa
Acid Solution (2% v/w H_2SO_4)	BRANZ Test Method	Weight loss/gain <2% @ 24 months exposure

** Moist priming of substrate, CSP3 surface roughness, failure within the mortar.*

*** Refer to Bluey for copies of test reports on accelerated testing.*

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Specification Clause for BluCem ZeoGlass

CONCRETE SURFACE PREPARATION

1.0 EXISTING CONCRETE SURFACE PREPARATION.

The concrete surface is to be profile/roughness per ICRI Guideline No 310.2, surface profile range CSP 6, free of contaminates, with a perimeter edge min depth of 10.0mm.

Corroded concrete shall be removed to achieve surface pH >8.2, or colour of purple when sprayed with phenolphthalein indicator.

Review reinforcement bar dimensions, and if it has lost 20% of its original diameter a structural engineer must be consulted. Retained steel must be cleaned back to surface standard of Sa2.5.

The existing concrete substrate should be saturated with clean water to achieve a SSD (saturated surface dry) condition prior to the application of the inorganic polymer mortar. Alternative priming option apply an acrylic primer as per technical notes.

1.20 NEW CONCRETE STRUCTURES

The substrate shall be water blasted to remove any contaminates. Apply an acrylic primer as per technical notes.

2.00 ACID RESISTANT INORGANIC POLYMER MORTAR

The mortar shall be a one component, blend of calcium alumino silicate binders and selected recycled, graded, glass aggregate, to which potable water will be mixed to form the inorganic polymer mortar. The material does not require alkali activation.

The mortar shall exhibit the following properties:

PROPERTIES	STANDARD	RESULT
Compressive Strength	AS1478.2 Appendix A	11% water 50MPa @ 24 hours 70MPa @ 7 days 80MPa @ 28 days 90MPa @ 56 days 13% water 40MPa @ 24 hours 55MPa @ 7 days 65MPa @ 28 days 75MPa @ 56 days
Flexural Strength	AS1012.11	6.1MPa @ 13% water
Setting Time	AS1012.18	Initial set - 190 minutes Final set - 280 minutes
Modulus of Elasticity	AS1012.17	>34.0GPa
Drying Shrinkage	AS1478.2 Appendix B	<390μstrain @ 7 days @ 11% water <500μstrain @ 28 days @ 11% water <570μstrain @ 56 days @ 11% water
Water Approval	AS/NZS 4020 (2018)	Certified

The mortar shall have been subjected to independent laboratory and field testing to validate the resistance to biogenic corrosion in aggressive sewer environments to provide a service life to meet the asset owner's specification.

The mortar shall be applied by wet spray or dry spray process, or hand trowel applied and cured in accordance with the manufacturer's product data sheet.

2.30 **BluCem ZeoGlass** meets this performance criteria of the mortar. **BluCem AP10** meets the performance criteria of the primer.

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