

# BluCem HS400

## THIXOTROPIC GROUT

BluCem HS400 is a one component cement powder which requires only the addition of water to form a thixotropic cementitious grout.

BluCem HS400 is a pumpable, top down applied product suitable for civil engineering applications. BluCem HS400 incorporates special fillers, silica fume and additives to form a cementitious grout which is low chloride content, low porosity, highly durable, aluminium and metallic expansion agent free.

### Application Advantages

- Pumpable
- Gravity resistant
- High early strength

### Lifecycle Advantages

- Low chloride content
- Low porosity highly durable
- Aluminium and metallic expansion agent free
- High load transfer to rock

### About the Product

BluCem HS400 is a thixotropic grout which will flow under pumping pressure but remain stable under gravity forces through its special blend of cement and fillers. This allows the grout to be applied in top-down application such as overhead rock bolting and ensures full encapsulation of bolts and filling of cavities without voids. BluCem HS400 has been widely used in various tunnel and mining applications due to its ease of use and reliability. The silica fume provides added density and durability for 100 year design life.

### Application Solutions

- Rock bolt grouting
- Rock fissure grouting
- Top down grouting of rock bolts
- Void filling where thixotropic properties are required

### Project Specification Clause

THIXOTROPIC GROUT - The thixotropic cementitious grout used for this project shall be a one component cement powder which requires only the addition of water to form a durable thixotropic product. 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 HS400 manufactured by Bluey Technologies or equivalent shall be accepted.

### Project Examples

Tunnel rock support, road cuttings, slab stabilisation.



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## Application Specification

### MIXING

- 1.1 Measure and place 90% of potable water into high shear mixing vessel. Start mixer and then slowly add BluCem HS400 powder. If powder addition is too fast then large lumps will form and final mix will be slow reaching uniform consistency. Finally add remaining water to reach the desired consistency. Following addition of all powder and water ingredients, it is critical that mixing is continued for a further 2 - 3 minutes to adequately dissolve all powder components and achieve final consistency.

### PUMPING

- 2.1 Once the grout has been mixed you need an effective pumping method to deliver it to the area of application. Various models of batch mixers and continuous mixers are available for use, all with varying specifications. 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.
- 2.2 Prior to pumping grout, 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.
- 2.3 Once the site is ready for grout placement, commence pumping. It is important to pump continuously and avoid the formation of cold joints.
- 2.4 Following completion, dispose of excess production material in consideration of the environment. Carefully wash out mixer tanks and agitators into the pump hopper and pump the resulting washout material through the grout hoses to a suitable disposal site. Drain any water out of the lines and hoses. Clean down the machinery and surrounding areas.

### APPLICATION TEMPERATURES

- 3.1 The mix water's temperature should be kept as low as possible to prevent the grout from hydrating too rapidly.
- 3.2 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. In some cases it may be necessary to cool the material, the mix water, or even the hose itself during the process and pre-planning the storage of all materials to keep the temperature as low as possible.
- 3.3 High-shear mixing can add 1 to 2°C per minute of mixing. In order to minimise this effect, add all ingredients to the mixer as quickly as possible and minimise prolonged batch-mixing procedures.
- 3.4 It is estimated that every 10°C increase in temperature will halve the product set time. Likewise every 10°C reduction will double the set time. These set time variances may have detrimental consequences for the final set product and Bluey Technologies should be consulted where extreme temperatures are anticipated.

### APPLICATION

- 4.1 BluCem HS400 must be pumped into place. Check ducts and forms for leaks prior to mixing and application of grout. Mix at low speed during pumping and placement to maintain work life. High speed mixing should be avoided during placement to prevent temperature rise of the mixed grout. Once pumping operations commence, continuous flow of grout is essential, therefore sufficient grout for the void must be prepared prior to placement. Pump grout into the bolt hole and do not stop until grout emerges from the bottom of the hole.

### CURING

- 5.1 Any exposed surface layers must be covered until initial set to prevent surface crazing. It is recommended that the final surface finish layer is coated with curing compound or otherwise maintained wet for at least 24 hours.

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### Product Data

Please refer to Important Notice on following page

Packaging	20kg, 750kg bags
Water Addition	6.0 - 8.0 litres per 20kg bag
Yield	12.8 litres per 20kg @ 30% water 13.8 litres per 20kg @ 35% water 14.3 litres per 20kg @ 37.5% water
Application Thickness	Refer to Bluey Technologies for advice and approval on pour thicknesses with dimensions exceeding 100mm
Pump Life	150 minutes @ 20°C
Silica Fume	>5%
Maximum Particle Size	45 microns (90% passing)

TESTED CHARACTERISTIC	STANDARD	RESULT
Portland Cement	AS3972	Complies
Aggregates	AS2758.0	Complies
Compressive Strength	AS1478.2	6.0 litres water per 20kg 25MPa @ 24 hours 60MPa @ 7 days 80MPa @ 28 days 7.0 litres water per 20kg 20MPa @ 24 hours 50MPa @ 7 days 70MPa @ 28 days 7.5 litres water per 20kg 17MPa @ 24 hours 40MPa @ 7 days 60MPa @ 28 days
Chloride Ion Content	AS2350.2	0.031%
Modulus of Elasticity	AS1012.17	2.88GPa
Bleeding	ASTM C940	<0.5% @ 35% water
Drying Shrinkage	AS2350.13	<500µstrain @ 28 days @ 35% water
Setting Time	AS1012.18	Initial set - 215 minutes Final set - 265 minutes
Fresh Wet Density	AS1012.5	2030kg/m³ @ 30% water 1925kg/m³ @ 37.5% water

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### IMPORTANT NOTICE

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