



QuakeWrap® Underwater Grout

Product Description

QuakeWrap Underwater Grout is a blend of cement, graded fine aggregate and chemical additives for free-flow or pumped grouting applications in underwater or tidal environments.

Properties

TEST METHOD	STANDARD	RESULT				
Compressive Strength	AS 1478.2:2005	Consistency	Water Addition	1 Day	7 Days	28 Days
		Flowable	4.4 L	25 MPa	44 MPa	53 MPa
Flexural Strength (Modulus of Rupture)	AS 1012.11 - 2000	1 Day	3.4 MPa			
		7 Days	7.3 MPa			
		28 Days	8.8 MPa			
Indirect Tensile Strength	AS 1012.10.2000	1 Day	1.7 MPa			
		7 Days	3.5 MPa			
		28 Days	4.1 MPa			
Tensile Bond Strength to submerged concrete		2.1 MPa				
Setting Time	AS 1012.18:1996	5.0 hours - initial set 7.5 hours - final set				
Fresh Wet Density		2050 kg/m ³ – depending on consistency used				
Alkali reactive particles	Rapid Mortar Bar Test (RTA T363)	Non-reactive				
Flow Characteristics	AS 1478.2:2005	400mm (Flow Trough)				
		Above Water	Below Water			
Minimum Thickness		10mm	10mm			
Maximum Thickness		80mm**	150mm			

** On thicknesses greater than 80mm in above water applications it can be bulked out with aggregate at 2:1 ratio

** Curing compound also needs to be applied to prevent dehydration

Property value clarification: The above properties values were derived from testing in a laboratory. Cube samples were used for compressive strength measurement. Test results can vary when carried out to an alternative standard or when sample dimensions vary.



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Test Results to ASTM Specification C1107: 2001

TEST METHOD	STANDARD	RESULT	
Flow Consistency	ASTM C1437:2007	132%	
Setting Time	ASTM C191:2008	Initial: Final:	5.4 hours 6.1 hours
Plastic Volume Change	ASTM C827:2010	+0.57%	
Hardened Volume Change	ASTM C1090:2010	1 day	0.68%
		3 days	0.68%
		14 days	0.68%
		28 days	0.69%
		56 days	0.67%
Compressive Strength	ASTM C109:2011b	1 day	25.0MPa
		3 days	46.6 MPa
		7 days	58.8 MPa
		28 days	67.6 MPa

Note: Tests were all completed at 25oC ± 2oC until completion of the test. Results in the above table were taken from independent third party testing. Testing was carried out at water addition rate of 4.4L per 20kg.

APPLICATION INSTRUCTIONS

Preparation

Remove any oil, grease or loosely adherent material from the substrate. In cases where the concrete surface is defective or has laitance, the substrate must be cut back to a solid base. Sand blasting or cleaning with a high-pressure jet should be carried out on substrates where has permanently immersed in water. Where the substrate is sporadically or nonimmersed the substrate can still be prepared through sand blasting or high-pressure cleaning. Otherwise brush hammering or scrubbling may be suitable.

Formwork

QuakeWrap Underwater Grout is a free-flowing grout and as such formwork should be constructed to be leakproof, a foam rubber strip can be used to achieve this.





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Mixing

To mix a forced actioned mixer is required, mix for 3 -5 minutes a speed of (400/500rpm) in an appropriately sized drum. A heavy duty 1600w with a 140 x 600 helical mixing paddle is recommend for mixing.

Note: Where larger quantities are mixed, it is essential to use a high shear vane mixer. A colloidal impeller mixer is not suitable.

Ensure that there is enough machine mixing capacity and available labour to enable grouting to be completed in a continuous manner, a holding tank with gentle agitation capabilities could be required for fluidity to be maintained. An accurate measurement of 4.4 litres of water per 20 kg bag should be first placed into the mixer, then add the grout slowly while mixing continuously mixing. Once all of the grout is added an additional 5 minutes of continuous mixing is required to give QuakeWrap Underwater Grout a grey colour and a smooth consistency.

Note: Fluidity increases with additional mixing.

Placing

QuakeWrap Underwater Grout must be placed within 20 minutes after mixing is completed to maximise the expansion properties of the grout.

Note: Continuous flow is needed for prevention air or water entrapment.

Pour or pump the grout to the lowest point of the formwork through a flexible tube (the tube used must have a minimum diameter of 50mm).

Caution: At the start of the grouting works, flow of the grout needs to be restricted to prevent water entrapment.

To reduce back pressure the tube can be raised as required, do not raise the tube above the surface level of the grout. The grout can be placed in thicknesses between 10mm up to 80mm in a single pour in application above water. In under water applications thicknesses of up to 150mm are permissible given the heat sink effect that occurs in under water environments.

Adding Aggregate

Note: Flow characteristics will be reduced when aggregate is added. When high flow performance is essential, addition of aggregate is not recommended.

Additional of 3mm to 6mm clean washed pea gravel is needed in applications where thicker sections are required. This can be done to create thicker sections of 1000mm to 3000mm for above water applications and 400mm for underwater applications. In instances where aggregate added exceeds 10kg per 20kg bag a concrete mixer is recommended, keeping unrestrained surface area to a minimum. In placements of greater than 200mm for above water applications a curing compound is required.

Slowly mix the aggregate in for an additional two minutes, do not exceed 4.4 litres of water as stated in the mixing section. When 10kg of aggregate is added typical yield will increase by 4 litres.

Curing

Curing is not required in sporadically or fully immersed applications. In above water applications thorough curing of exposed areas is recommended. This can be done through application of a suitable curing membrane, wet hessian and/or continuous water application.



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Cleaning

QuakeWrap Underwater grout is comparatively harder to clean off equipment than other cementitious grouts due to its water resistant properties. Hot water can assist with cleaning. Mechanical removal is required for grout that is cured.

Limitations

Do not apply QuakeWrap Underwater grout below 5°C.

Supply

QuakeWrap Underwater Grout 20kg (50 x bags per pallet)

Yield

11.60 litres per 20kg bag when mixed with 4.4 litres of water.

Note: make allowances for wastage when estimating quantity requirements.

Storage

36 months from manufacture date when kept in original unopened bags (date of manufacture is printed on the side of the bag).

Note: Do not use when lumps are present in the product or when the product loses workability that requires more water to be added. Shelf life is reduced in areas of high temperature or high humidity.

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Hychem warrants that this product shall conform to the technical specifications published in the product literature. The quality and fitness of the product is dependent upon the proper use and application of the product by the applicator. Hychem has no role in the application of the finished polymer other than to manufacture and supply its components. It is vital that the person applying this product understands the product and is fully trained and certified in the use of spray equipment and application of sol-gel materials. There are no warranties that extend beyond the description on the face of this instrument, except when provided in writing, directly by Hychem and executed under seal by a company officer.

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