Freecem® S 60

Free flow, high strength cementitious engineering grout with dual shrinkage compensation

The Construction Alchemists

Description

Freecem® S 60 is a single component cementitious ready to use powder. On mixing with specified amount of water, it produces a free flow, non-shrink, high strength grout which can be used to fill gaps from 50mm to 100mm in single pour. Freecem® S 60 is a formulation of Portland cement, selected graded sand fillers and speciality additives. The water demand for mixing is controlled by the combination of all ingredients to ensure controlled expansion and high early strength.

Features & Benefits

- Dual shrinkage compensation.
- Chloride free formulation to develop high early strength.
- Non-metallic fillers used ensures long term durability without the risk of corrosion and staining.
- Prepacked, pre-batched material supplied in ready to use condition after mixing with specified amount of water at site. Hence site batching is avoided .
- Enhanced rheology ensures optimum contact with the load bearing areas for perfect support.

Primary Application

Freecem® S 60 is suitable for supporting machine equipment with static loads and dynamic loads. Commonly used for grouting base plates of boilers, static equipment such as - storage tanks, power generation systems etc. It can also be used for wide range of anchoring application such as- tall masts, transmission towers etc.

Technical properties

Water/powder ratio	0.16 - 0.19
Fresh wet density	2.22 g/cc (depending on actual consistency used)
Flow by BS cone (As per BS 890) **Initial** **Final**	 300mm (maximum) 225mm (after 15 minutes)
Setting time (As per IS:4031 (Part 5)-1988) **Initial** **Final**	 60 minutes 240 minutes
Compressive strength (As per ASTM C109) **24 hours** **3 days** **7 days** **28 days**	 23 MPa 45 MPa 50 MPa 65 MPa
Flexural strength (As per BS:1881 (P-116)) **24 hours** **3 days** **7 days** **28 days**	 2.5 MPa 6 MPa 8.5 MPa 10.5 MPa
Tensile strength (As per ASTM C307)	4 MPa @ 28 days
Pull-out Bond Strength (Lab developed test - Reinforcing steel rod of 25mm dia embedded in the grout mix poured into pipe of 100mm and 200mm length)	5.4 MPa @ 28 days
Modulus of Elasticity (As per ASTM C469)	30890 MPa
Co-efficient of thermal expansion (As per ASTM C531)	10×10^{-6} to 12×10^{-6} /°C
Plastic Expansion (As per ASTM C827)	3%
Hardened Expansion (As per ASTM C1090)	0.003%
Pressure to restrain	≈ 0.004 MPa

For thicker sections Freecem® S 60 may required to be mixed with coarse aggregates as per BS:1881 (P-116).

% proportion of aggregates of total powder	Min. Compressive Strength (MPa)			
	24 hrs	3 days	7 days	28 days
50%	42	50	60	75
75%	45	55	65	80
100%	50	60	70	82

Specification Clauses

All grouting work must be carried out using a pre packed chloride free cementitious product which shall be mixed with clean water to achieve the required consistency, without bleeding or segregation. A positive volumetric expansion of 2 - 4% shall occur while the grout is in plastic and hardened state by means of dual shrinkage compensating system. The compressive strength of the grout shall not be less than 50 MPa at 7 days and 60 MPa at 28 days.

Application Instructions

Surface Preparation

Foundation Surface

The substrate surface must be free from oil, grease or any loose material, debarring agents such as laitance, bolt holes and fixing pockets must be blown clean of any dirt or debris.

Wetting

Several hours prior to placing, the concrete substrates should be soaked with fresh water before grouting to saturate the surface.

Freecem® S 60

The Construction Alchemists

Base plate

The surface of the base plate which is likely to come in contact with the grout shall be cleaned thoroughly to remove any possible rusting, oil, mill scales etc. The base plate shall have holes to allow venting of air during grouting operation.

Formwork

The formwork shall be erected as required to be completely leak proof. The joint between the form work and concrete shall be sealed with foam or rubber strips or by any other suitable means. In some cases it may be necessary to provide outlets for draining out the water used for wetting the surface. The form work shall be fixed such that the grout thickness should not exceed 150mm on pouring side and 50mm on all other sides. Air vents shall be provided suitably as required.

Mixing

The grout shall be mixed with powered heavy duty low speed paddle mixer fitted to a drilling machine. To achieve continuous grouting without time lag, availability of enough number of man power shall be ensured before hand. Quantity of clean water for 25 Kgs powder to achieve a flowable consistency shall not be more than 4.35 liters. The water shall be accurately measured and placed in the container, before Freecem® S 60 powder is added into the container while agitating the mixer. It may take around 5 minutes of mixing to achieve uniform consistency of the grout. The water powder ratio shall not exceed 0.19. Hand mixing shall be avoided.

Application

Place the mixed grout within 15 minutes of mixing to gain full benefit of the expansion process. It can be placed in thicknesses up to 100mm in a single pour when used as an underplate grout.

For thicker sections it is necessary to mix Freecem® S 60 with well graded aggregates to minimize heat build up (Refer "Technical Properties for strength details"). Any bolt pockets must be grouted prior to grouting between the substrate and the base plate. Continuous grout flow is essential. Sufficient grout must be prepared before starting. The time taken to pour a batch must be regulated to the time to prepare the next one.

Pouring should be from one side of the void to eliminate any air or pre-soaked water becoming trapped under the base plate. It is advisable to pour the grout across the shortest distance of travel. The grout head must be maintained at all times so that a continuous grout front is achieved. Where large volumes have to be placed Freecem® S 60 may be pumped. A heavy duty diaphragm pump is recommended for this purpose. Screw feed and piston pumps may also be suitable.

Curing

On completion of the grouting operation and initial set, the grout in the exposed areas shall be cured with water or by Talrakcure range of curing compounds.

Estimating
Packaging

Freecem® S 60 is supplied in 25 Kg bag.

Yield

The approximate yield per 25 kg bag for flowable consistency is about 13.0 liters. Allowance should be made for wastage when estimating quantities.

Storage

Freecem® S 60 has a shelf life of 6 months if kept in dry store in original, unopened bag. If stored at high temperature and/or high humidity conditions the shelf life may be reduced.

Precautions
Health & Safety Instructions

Freecem® S 60 is alkaline and should not come in contact with skin or eye. Inhalation of dust during mixing should be avoided. It should never be ingested. However, if it comes into contact with eyes, wash immediately with plenty of water and seek medical treatment. Gloves, goggles and protective clothing should be worn.

Talrak Construction Chemicals Pvt. Ltd.

An ISO 9001:2015 Certified Company

Works:

Plot No. 115-A, 1st Phase. Harohalli Industrial Area,
Kanakapura Taluka - 562 112. Ramanagar Dist.
www.talrak.in