Freecem® HES90

Free flow, Ultra high early strength, non-shrink cementitious engineering grout

The Construction Alchemists

Description

Freecem® HES90 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® HES90 is a formulation of Portland cement, selected graded fillers and speciality additives. The water demand for mixing is controlled by the combination of all ingredients to ensure controlled expansion, high fluidity 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® HES90 is suitable for supporting machine equipment with high gravity. Commonly used for grouting base plates of boilers, static equipments such as - storage tanks, power generation systems, bridge bearing supports etc. It can also be used for wide range of anchoring application such as- tall masts, transmission towers etc.

Technical properties

The mixed material with water powder ratio of 0.16 - 0.17, upon curing exhibits the following properties :

Physical properties

Flow by BS Cone (mm) -As per BS 890

Initial (Maximum)	300mm
Final (After 15 minutes.)	225mm

Compressive Strength

without coarse aggregates as per ASTM C109

Age (days)	24 hrs	3 days	7 days	28 days
Min. Compressive Strength (MPa)	40	65	85	95

With coarse aggregate as per BS:1881 (P-116)

% proportion of aggregates of total powder	**Min. Compressive Strengths (MPa)**			
	24 hrs	3 days	7 days	28 days
30%	50	67	87	98
50%	55	75	92	102

Flexural Strength as per ASTM C384

Age (days)	24 hrs	3 days	7 days	28 days
Flexural Strength (MPa)	4.8	8.3	9.8	11.8

Tensile Strength : 5.0 MPa @ 28 days as per ASTM C307

Pullout bond Strength @ 28days (Dia of pipe - 90mm; Length of Rod - 200mm)

10mm	8.4MPa
12mm	9.9MPa
16mm	10.9MPa

Setting Time as per IS :4031(Part 5)-1988

Initial	60 minutes
Final	240 minutes

Freshwet density of wet grout : ≈ 2320kg/m^3 depending on actual consistency used.

Modulus of Elasticity: 31790MPa as per ASTM C469

Co-efficient of thermal expansion : 1 x 10^{-4} to 1.5 x 10^{-4}/°C as per ASTM C531

Expansion

Plastic Expansion (As per ASTM C827)	3%
Harden Expansion (As per ASTM C1090)	0.003%

Pressure to restrain : ≈ 0.004MPa

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Specification Clauses

Performance Specification

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 85MPa at 7 days and 95MPa at 28 days.

Application Instructions

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 saturated surface condition.

Base plate

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

Form work

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 liters. The water shall be accurately measured and placed in the container, before Freecem® S 90 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 0.17 Hand mixing shall be avoided.

Curing

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

Estimating
Packaging

Freecem® HES90 is supplied in 25 Kg bag

Yield

Allowance should be made for wastage when estimating quantities. The approximate yield per 25 kg bag for flowable consistency is about13.0 liters.

Storage

Freecem® HES90 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® HES90 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

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Ref : TCC/TDS/GA13 - R0