



TechFlow® ProGrout HFR

High Flow Non-Shrink, Ultra-High Performance Specialty Cementitious Precision Grout.

Description:

TechFlow® ProGrout HFR is a Pre-bagged factory quality controlled ready to use chloride and hydrogen free, high flow, pourable cementitious specialty grouts with high compressive strengths. **TechFlow® ProGrout HFR** consists of a precisely proportioned blend of Portland cement, graded fillers, supplementary cementing materials and special chemical additives to ensure hydrogen free expansion, give shrinkage compensation, frost resistance in both the plastic and hardened states, and include a crystal growth material to compensate for drying shrinkage

TechFlow® ProGrout HFR is designed for uniform mixing and eliminates unwanted segregation and bleeding over a wide range of application and to achieve superb flowability while reaching high early and ultimate compressive strengths.

Application Includes:

TechFlow® ProGrout HFR is formulated for use at any consistency from fluid to damp-pack, and may be used with confidence for bedding, grouting and precision bearing operations for following such as-

- Machine base plates
- Bridge bearings
- Crane rails, generators, presses, milling machines
- Anchor bolts & rods
- Columns base
- Precast elements Gas or steam turbines
- Precast elements
- Suitable for use in bridge bearing applications
- Form and fill concrete repairs
- It is particularly suited for situations where hydrogen expansion grouts are not allowed

Features & Benefits:

- **Non-shrink**-Will continue to occupy the filled space without shrinkage. Ensures high level of contact with load bearing areas. Also helps complete filling without voids. No need for external aids like rodding, poking, chaining etc.
- **Increased strength**-Can be used under heavy duty machines and equipment with high operational and static loads.
- **Prepacked and factory controlled**-Consistency and reliability ensured. Site batching and blending variations eliminated.
- **Iron free**-No chance of deterioration by uncontrolled rust expansion, corrosion and staining of grout.
- **Chloride free**- Does not cause corrosion of machine parts, anchor bolts etc., in contact with grout.

Applications Instructions

Substrate Preparation

Surface laitance and unsound concrete must be chipped away so that a reasonable rough, but strong sound surface is provided. All surfaces must be free from oil, grease and dust, this particularly applies to the underside of base plates, bolts, pipes or other materials which may have surface contact with the grout. After cleaning, saturate the concrete surfaces with clean water. Ensure that no free standing water is present on surfaces of foundations or in bolt holes before applying of **TechFlow® ProGrout HFR**

Typical Properties at 25°C

Appearance		Free flowing grey powder (Typical Value)					
Fresh Wet Density		~2250 kg/m ³ (depending on actual consistency used.)					
Application thickness		20mm - 125mm					
Application temperature		5-30°C					
Placement Time		Within 25mins of mixing					
Compressive strength ASTM C109/109M-11	Consistency	U n i t	W/ P R a t i o	1day	3 Days	7 days	28 days
	Flowable	5c m c u b e	0. 16	> 25 MPa	> 55 MPa	>65 MPa	> 75 MPa
Flexural strength N/mm ² ASTM C348				> 2 MPa		> 7 MPa	> 9 MPa
Set Time	Stiff Mix Pourable Mix Free flowing Mix	Initial			Final		
		2.5hrs -3hrs 3.5hrs -4hrs 4.5hrs -5hrs			4.5hrs -5hrs 6.5hrs -7hrs 7.5hrs -8hrs		
Expansion characteristics ASTM C827/C827M-10		≤ 2%					
Bleeding: ASTM C940		Nil					
Flow Characteristics (efflux Time) ASTM C939		25 - 35 sec					
Tensile strength at 28 days		Typically 3.5 N/mm ² .					
Material required for 1m ³ Volume of Grout, kg		2000-2100 Kg					
Standards		Complies with ASTM C1107, Grade C.					
<p>Note: Compressive strength is determined by using 5cm cube specimen at laboratory controlled condition, Water demand may vary depending upon site condition.</p>							

Treatment of Exposed Grout Shoulders

Due to differences in temperature between the grout under the base plate, and exposed shoulders that are subject to more rapid temperature changes, debonding and / or cracking can occur. Avoid shoulders wherever possible. If shoulders are required, they should be firmly anchored with reinforcing to the substrate to prevent debonding.

Action

TechFlow® ProGrout HFR begins to act as soon as water has been added to the mix effecting the controlled expansion characteristics. This reaction continues until firm contact is made with the confining surfaces or until the material sets. The controlled expansion of **TechFlow® ProGrout HFR** will offset shrinkage due to settlement, hydration and evaporation.

Curing:

On completion of grouting the exposed area should be covered with wet hessian, plastic sheeting or **TechnoFinish® ConKure 101/102** to prevent excessive moisture loss. At ambient temperature, formwork should be removed no sooner than 24 hours after completion of grouting. The covering should stay in place for a further 6 days. Lack of sufficient curing could result in plastic cracking and drying shrinkage on the surface.

Cleaning:

Clean all equipment promptly with **TechnoFix® CleenzolPlus**. Any excess cured material will have to be mechanically removed.

Packaging:

TechFlow® ProGrout HFR is available in 30 kg bags.

Storage & Shelf Life:

TechFlow® ProGrout HFR has a shelf life of 12 months from date of manufacture if stored at temperatures between 5°C and 40°C in original unopened bags. If these conditions are exceeded, STIPL Technical representative should be contacted for advice.

Health & Safety Instructions:

Some people are sensitive to epoxy resin so gloves and a barrier cream or similar should be used when handling these products. If contact with the resin occurs, it must be removed before it hardens with a resin removing cream. Follow by washing with soap and water. Do not use solvent. The use of goggles is recommended but should accidental eye contamination occur, wash thoroughly with plenty of clean water and seek medical treatment immediately.

Formwork

It is essential that the formwork to be constructed is leak proof and water tight. In order to achieve this it is recommended that foam rubber strips or a suitable sealant such as polyurethane or silicone be used underneath the formwork. The formwork should be constructed, which will allow and ensure a grout head is maintained on the side above the level of the underside at the base plate. The formwork should allow for gravity flow of grout with a suitable grout head allowing for continuous flow between the base plate and the concrete substrate.

To ensure ease of formwork removal, the formwork should be coated with form oil or release oil prior to grouting (consult STIPL's Technical representative for additional information). It is recommended that **TechFlow®ProGrout HFR** be kept in a cool environment and the use of cold water be used for mixing. It is recommended that in instances where the temperature is greater than 30°C, the grouting be conducted early in the day or late in the evening and sheltered from sunlight and direct heat.

Unrestrained Surface

This must be kept to a minimum. Generally the gap width between the perimeter formwork and the plate edge should not exceed 75 mm on the pouring side and 25 mm on the opposite side. It is advisable where practical to have no gap at the flank sides

Low Temperature Working

At temperatures below 5°C the cure rate and strength development rate will be dramatically reduced. If early strength is required, it is advisable to use heated water and condition **TechFlow®ProGrout HFR** to 25°C. Do not exceed this temperature.

High Temperature Working

At temperatures above 30°C, it is advisable to use water below 20°C when mixing grout. All materials must be kept cool and away from direct sunlight. If practical, the installation area should be shaded by erecting shade screens. If ambient temperatures are excessive, grouting should be scheduled for early morning or late afternoon.

Mixing

Use mechanical mortar mixers, preferably of the slow speed (250-350 rpm) paddle mixer or revolving drum type mixer. Hand mixing rarely achieves the desired result. Allow approx. 5 minutes for mixing. Thorough mixing is essential for achieving maximum results. Add **TechFlow®ProGrout HFR** slowly into recommended amount of clean water in a mixer. Use as little water as is required for ease of placement.

Consistency	TechFlow®ProGrout HF	Potable Water Addition (Litres)	W/P Ratio
For Flowable Mix	30 Kg	4.80- 5.40 Litre	0.16 to 0.18
For Plastic Mix	30 Kg	4.20 -4.80 Litre	0.14 to 0.16
For Stiff Mix	30 Kg	3.60- 4.2 Litre	0.12 to 0.14

Caution: Unopened bags are to be kept in a shaded area water used for mixing should be below 25°C, particularly in high ambient temperature conditions. Do not mix by hand. Do not add additional water. Discard any unused grout that has stiffened or hardened. Do not retemper.

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Additional Information: Techno Builders Solutions® By Sterling Technotrade India Pvt.Ltd -The Specialist Construction Chemicals Company® range of associated products includes high performance concrete Admixtures, Adhesives, Protective Coatings, Concrete Repairs, Industrial Flooring, Grouts & Anchors, Joint Sealants, Surface Treatments, curing compounds, repair mortars, release agents, Grinding Aids & Waterproofing.

*Separate datasheet are available on these products.

Adding aggregate for thicker sections

When aggregate "bulking" is required addition rate for the 5-13mm aggregate should be confirmed by site trials. Typically, the addition rate would be between 12-15kg's of clean dry aggregate per 30kg bag of **TechFlow® ProGrout HFR**. Add the aggregates to the mixing water in the concrete mixer and then slowly add **TechFlow® ProGrout HFR** powder and mix for 5 minutes until a lump free uniform consistency is achieved-Ideally the slump should be 75-200mm depending upon application requirements.

Placing

Grouting should be done continuously. Therefore make sure that sufficient grout is prepared before starting. While filling voids, grout should be poured from one end to avoid air pockets.

The following measures shall be taken while placing the grout:

- Grouting operations should be preferably carried out in a shaded condition.
- Avoid grouting at the hottest time of the day. Place the grout within 15 minutes of mixing to obtain best results
- Grouting should not be done in free & unrestrained areas as the gaseous expansion of the grout will lead to development of cracks.

TechFlow® ProGrout HFR can be poured from minimum 20mm up to 125mm in one single pour. However, for depths greater than 125mm it is recommended to add the 5-13mm aggregate to the grout in order to reduce the heat generated during the exothermic reaction when the grout is mixed and poured for larger depths should be confirmed by site trials. Cover the exposed areas immediately after placing with a polythene sheet, to protect from drying winds. Typically, the addition rate would be between 12-15kg's of clean dry aggregate per 30kg bag of **TechFlow® ProGrout HFR**.