



TechFlow[®] ProGrout UW

High Performance Non-shrink cementitious Grout for underwater Application.

Description:

TechFlow[®] ProGrout UW is a Pre-bagged factory quality controlled ready to use dry powder non-shrink cementitious grout designed to resist "wash-out" in underwater or tidal zone grouting applications. TechFlow[®] ProGrout UW requires only on mixing with the specified quantity of potable water before use and exhibits resistance to washout of cement and fines, while resisting the blending of external water into the plastic grout.

TechFlow[®] ProGrout UW consists of a precisely proportioned blend of Portland cement, amine-based corrosion inhibiting additives, graded fillers, supplementary cementing materials and special chemical additives to impart controlled expansion and exceptional cohesiveness for maximum flowability and strength and allow the product to set underwater without excessive expansion. Corrosion inhibiting additives help prevent corrosion on the rebar, threaded rod, or other metals embedded in the concrete.

Application Includes:

TechFlow[®] ProGrout UW can be used in many underwater application fields including:

- Recommended for underwater grouting for bridge columns, concrete pilings and dam repairs where a "wash-out" resistant, free-flowing or pumpable nonshrink, high strength grout is required.
- Recommended for grouting to repair deteriorated underwater or tidal zone concrete structures without significant "wash-out" of the cement.
- Applications include bridge columns, concrete piling and dams.
- Particularly effective when used with metal or fiberglass jackets, around the pilings, to fill the annular space completely.

Features & Benefits:

- Shrinkage compensated - continues to retain filled volume.
- Non-wash out - No significant cement wash out under water. "Wash-out" resistant thixotropic consistency dependable underwater repairs. Gains full strength even under water.
- Free flowing - flows easily even in gaps as narrow as 20 mm, to facilitate complete filling of voids.
- Pre packed - Pre-bagged factory quality controlled ready to use, no batching or blending errors. Consistency in performance from batch to batch.
- Dense micro structure - resists water ingress. Protects steel.
- High early and final strengths - early load transfer and rapid installation.
- High bond strength - primer not required to facilitate good bond. Adjustable consistency.

Applications Instructions

Substrate Quality

Concrete:

Surfaces must be sound, clean free from ice, oils, grease, standing water and any loose or friable particles and any other surface contaminants. The concrete "pull off" (tensile) strength should be > 1.0 MPa.

Steel & iron:

Clean, free from oil, grease, rust and scale etc.

Surface Preparation

Concrete Surfaces:

All defective host substrate must be removed prior to application. Defective material includes cracked or structurally weakened surfaces and also chloride contaminated and carbonated concrete. A concrete corrosion expert must be consulted for critical projects or structural applications. Host concrete must be roughened and aggregate exposed to ensure good bond. Mechanical chipping or shot blasting of the surface is recommended for this purpose. All surfaces must be free of dust, oils and surface contaminants. Bolt holes and fixing pockets must be blown clean of any dirt or debris. Immediately before grouting takes place any free water should be removed with particular care being taken to blow out all bolt holes and pockets.

Steel Surfaces:

The base plates, machinery bolts, etc. must be clean and free from oil, grease and rusting. Degreasing shall be carried out thoroughly, in case of any contamination.

Specification clauses / Performance specification

All underwater grouting (specify details and areas of application) must be carried out with a prepackaged cement based product, which shall be mixed with water on site at a Water Powder ratio of 0.18-0.22. The grout must not bleed or segregate, must be iron-free and chloride free. Expansion of 1 - 4% shall occur while the grout is plastic by means of a gaseous system. The grout shall contain special admixtures to minimise washout in underwater applications. The compressive strength of the grout must exceed 30 N/mm² at 7 days and 50N/mm² at 28 days. The grout must be stored, handled and placed strictly in accordance with the manufacturer's instructions.

Supplier specification

All underwater grouting (specify details and areas of application) must be carried out using **TechFlow[®] ProGrout UW** manufactured by Sterling TechnoTrade India Pvt. Ltd, applied strictly in accordance with the manufacturer's technical data sheet.

- High early and ultimate strength for fast repair and turn around without chlorides
- Positive expansion for maximum durability and adhesion

Curing:

Curing will not be required in intermittently or totally submerged situations. However, when cast above water, all 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:

All tools should be cleaned immediately after application on using water. Because of its water resisting properties, equipment used for **TechFlow® ProGrout UW** will be harder to wash than with a cementitious grout. Use of hot water greatly reduces the time required for cleaning. Do not use hot water for mixing with **TechFlow® ProGrout UW**. Hardened materials must be cleaned mechanically.

Packaging:

TechFlow® ProGrout UW is available in 30 kg bags.

Storage & Shelf Life:

TechFlow® ProGrout UW 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's Technical representative should be contacted for advice.

Placing

- Place the mixed grout within 20 minutes after mixing to gain full benefit of the expansion process. Introduce a flexible pipe of minimum 50 mm diameter and fitted with a funnel at the top into the formwork under water. Ensure that the mouth of the pipe is about 50 mm above the bottom of the form.
- Place the grout slowly and continuously into the funnel (above water). At the start of the operation, the material flow should be restricted in order to avoid any water entrapment. The bottom of the tube may be raised as necessary to reduce any back pressure but should not be raised above the level of the material.
- Place at least 20% more grout than the estimated requirement. Where situation demands, use a double diaphragm air operated slurry pump to pump the grout

Typical Properties at 25°C

| | | | | | | | |
|---|--|--|-------------------------------|---|-------------|--------------|--------------|
| Appearance dry | | Free flowing grey powder | | | | | |
| Fresh Wet Density | | ~2250 -2300kg/m ³ (depending on actual consistency used.) | | | | | |
| Application thickness | | 20mm – 100mm | | | | | |
| Placement Time | | Within 20mins of mixing | | | | | |
| Compressive strength at 20°C ASTM C109/109M-11 | Consistency | Unit 5cm cube | W/P Ratio 0.18- 0.19 | 1day | 3 Days | 7 days | 28 days |
| | Flowable | | | ≥ 22 MPa | ≥ 34 MPa | ≥ 38 MPa | ≥ 45 MPa |
| Flexural strength ASTM C348 | Flowable | | | ≥ 4.0 MPa | | ≥ 6.0 MPa | ≥ 8.0 MPa |
| Tensile strength | | | | ≥ 2.0 MPa | | ≥ 3.0 MPa | ≥ 4.0 MPa |
| Application temperature | | >10°C | | | | | |
| Storage temperature | | 10-35°C | | | | | |
| Potlife | | ~20 minutes at +30°C | | | | | |
| Set Time ASTM C 191 | | Initial | | | Final | | |
| | | ≈ 5 – 6 hr | | | ≈ 6 – 7 hr | | |
| Expansion characteristics ASTM C827/C827M-10 | | 1- 4% | | | | | |
| E-Modulus | | similar to high strength concrete | | | | | |
| Water: Powder Mixing Ratio | For Flowable consistency Water: Powder = 0.18 to 0.19 by weight (5.4 L to 5.7 L water per 30 kg bag). | | | For Pourable consistency Water : Powder = 0.15 to 0.17 by weight (4.5 L to 5.1 L water per 30 kg bag) | | | |
| Standards | Meets the performance requirements of ASTM C 1107, combination volume adjusting grout specification for packaged, dry, hydraulic-cement grout (non-shrink) | | | | | | |
| Temperature limitation: Should not be applied below 5°C. | | | | | | | |
| Note: Compressive strength is determined by using 5cm cube specimen at laboratory controlled condition, Water demand may vary depending upon site condition. TechFlow® ProGrout UW is a free flowing powder designed to be mixed with water. After mixing and placing, the color may initially appear much darker than the surrounding concrete. While this color will lighten substantially as the concrete cures and dries out, the grout may always appear somewhat darker than the surrounding concrete. | | | | | | | |

Application thickness

TechFlow® ProGrout UW may be placed in thicknesses upto 80mm in one pour when placed above water. When placed under water, the heat sink effect in this environment permits thicknesses upto 150mm to be placed. For thicker sections upto 200mm above water and 400mm under water, it is necessary to fill out **TechFlow® ProGrout UW** using a clean, rounded and well graded aggregate in the size range 2mm upto 10mm. The quantity of aggregate added should not exceed 1 part aggregate to 1 part **TechFlow® ProGrout UW** by weight. For such mixes a concrete mixer must be used. Unrestrained surface area should be kept to a minimum.

Formwork

Proper design of formwork is essential for effective grouting. The formwork can be made out of timber, steel, or any other suitable material depending on the circumstances. The forms must be grout tight, strong, and well braced to withstand the water pressure and the fluid pressure of the grout till it sets. 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

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directly into the funnel. A hand operated pump or manual placing can also be employed.

- Maintain the continuity of grout flow preparing batches of mix **TechFlow® ProGrout UW** made readily available. Lengths of chains may also be employed in the formwork prior to placing, which enables grout for free flow over large areas and to ensure evacuation of entrapped air. Use chains, rods, or tamping to compact grout and remove voids, strike off exposed areas. Cover immediately after placement with wet burlap or polyethylene.
- Note: The pump is required only to convey the grout from the mixing site to the placing site and not to build up pressure.
- It is advisable to get a diver inspect the grouted area periodically for any leaks during and immediately after grouting

Health & Safety Instructions:

TechFlow® ProGrout UW may cause irritation to skin or eyes. In case of accidental contact with eyes, immediately flush with plenty of water and seek medical advice is necessary. For further information refer to the Material Safety Data Sheet.

Disclaimer: The product information & application details given by the company & its agents has been provided in good faith & meant to serve only as a general guideline during usage. Users are advised to carry out tests & take trials to ensure on the suitability of products meeting their requirement prior to full scale usage of our products. Since the correct identification of the problems, quality of other materials used and the on-site workmanship are factors beyond our control, there are no expressed or implied guarantee / warranty as to the results obtained. The company does not assume any liability or consequential damage for unsatisfactory results, arising from the use of our products.

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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.

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. If repairing a vertical surface, the gap between the formwork and the substrate surface should be wide enough to accommodate the tremie (watertight) pipe that will be used for placing the grout. Seal all the gaps in formwork and those between formwork and concrete surface, with a suitable underwater setting material such as Rapid setting cementitious repair mortar for underwater applications.

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 UW** 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.

Mixing

TechFlow® ProGrout UW must be mixed mechanically, using a slow speed electric drill fitted with mixing paddle. Larger quantities may require conventional power mixers. Measure the required quantity of clean water. Pour approx. 2/3 of the measured quantity of water into the container/mixer then add **TechFlow® ProGrout UW** slowly while mixing. Add the remaining water and mix until a smooth, uniform homogenous consistency is achieved. Mix batch for a minimum of 5 minute and place immediately. Do not attempt to re-temper with the mixed **TechFlow® ProGrout UW** by the later addition of water.

Note: **TechFlow® ProGrout UW** is cement based product. Do not exceed limitations set by ACI in mixing or placement of concrete. The need to observe the accurate gauging of water addition and the stated mixing time should be stressed to all operatives and, wherever possible, included in specifications.

| Consistency | TechFlow® ProGrout UW | Potable Water Addition (Litres) | W/P Ratio |
|--------------------------|-----------------------|---------------------------------|--------------|
| For Flowable consistency | 30 Kg | 5.4- 5.7 Litre | 0.18 to 0.19 |
| For Pourable consistency | 30 Kg | 4.5 -5.1 Litre | 0.15 to 0.17 |

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.

Limitations

Do not use **TechFlow® ProGrout UW** for patch repair work etc. Ensure formwork is secure and watertight to prevent movement and leaking during placing and curing. Use chilled water for mixing in high ambient temperature. Depending on requirements and site conditions the addition of dry, single size and clean aggregates is possible. Trials are recommended to confirm suitability of aggregates to be used. For large bedding holes and higher gaps duly washed coarse aggregates of size 2-10mm down may be mixed with **TechFlow® ProGrout UW**. For additional technical information on **TechFlow® ProGrout UW** or other grouting materials contact STIPL's technical services department.