

Non-shrink, free flow, general purpose cementitious grout

Uses

Conbextra GPI is used for effective support beneath load bearing units especially where static and operational loads apply. Also as an efficient medium for transferring all operational loads to the foundation.

For free flow grouting of machine base plates, crane and transporter rails, standing equipment bed plates, stanchion bases, steel rolling mill beds, pump sets etc.

Advantages

- **Non-shrink** - Will continue to occupy the filled space without shrinkage. Continues to provide support to the bearing areas and dampens vibration.
- **Free flow** - Ensures high level of contact with load bearing area. Also helps complete filling without voids. No need for external aids like rodding, poking, chaining etc.
- **Pre-packed 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.

Description

Conbextra GPI is supplied as a ready to use dry powder, requiring only the addition of water to produce a free-flowing, non-shrink grout. The material is blend of specially processed cement, pregraded fillers and additives which impart :

- Good early and final strengths due to very low water requirement
- Controlled expansion to retain the original volume filled even after setting
- Free flow characteristics without any segregation and bleeding.

Conbextra GPI, on setting will have a micro-cellular structure with high frost, fire and oil resistance.

Technical support

An experienced technical advisory team is available to give technical service on request.

Properties

Compressive strength : (BS1881 : Part 116, 1983)

Age(days)	Compressive strength (N/mm ²) consistency (W/P - 0.19)
	Flowable
1	10
3	27
7	35
28	45

Compressive strength with addition of aggregates

Age (days)	Compressive strength (N/mm ²) (W/P 0.19)		
	Aggregate by weight		
	50%	75%	100%
1	12	14	16
3	29	32	34
7	38	40	44
28	48	50	53

Note : Cubes cast were kept under resistant before testing to simulate site condition. Size of the cubes used 70.6mm x 70.6mm x 70.6mm tested at 30°C.

Young's modulus : 24 kN/mm²

Expansion characteristics : Controlled expansion occurs in the unset material to ensure that the grout, when cured, will continue to occupy its original volume within the confines of the voids in which it has placed.

Unrestrained expansion : 1 to 4%

Time of expansion : Starts 20 minutes
Finish 150 minutes

Pressure to restrain : Approx. 0.004 N/mm²
plastic expansion

Note : It is necessary to restrain free flow grout edges over 50mm wide. Otherwise unrestrained expansion may lead to some cracks.

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Coefficient of thermal expansion : 11×10^{-6} per °C

Thermal conductivity : 1.04 W/m⁰ C

Fresh wet density : At flowable consistency 2170 kg/m³

Water powder ratio :

Consistency	W/P	Water required per 25 kg bag
Flowable	0.19	4.75 litres

Flow characteristics : The maximum distance of flow is governed by the gap width and the head of the grout. Typical data for flow design, assuming grout is poured immediately after mixing, is given in the table below.

Grout Consistency	Gap width (mm)	Max flow distance in mm		
		50mm head	100mm head	250mm head
Flowable	30	500	1000	2000
	50	1000	2000	3000+

N.B : This table is based on the following factors: Temperature - 25°C : Water saturated substrate; Minimum unrestricted flow width : 300mm.

Specification Clauses

Performance specification : All 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 water powder ratio of 0.19. 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. The compressive strength of the grout must exceed 30 N/mm² at 7 days and 40 N/mm² at 28 days. The grout must be stored, handled and placed strictly in accordance with the manufacturer's instructions.

Supplier specification : All grouting (specify details and areas of application) must be carried out using Conbextra GPI grout manufactured by Fosroc applied strictly in accordance with the manufacturer's application manual for Conbextra grouts.

Application instructions

Preparation

Foundation surface

The substrate surface must be free from oil, grease or any loosely adherent material. If the concrete surface is defective or has laitence, it must be cut back to a sound base. Bolt holes and fixing pockets must be blown clean of any dirt or debris.

Pre-soaking

Several hours prior to placing, the concrete substrates should be saturated with clean water.

Immediately before grouting takes place any free water should be removed with particular care being taken to blow out all bolt holes and pockets.

Base plate

It is essential that this is clean and free from oil, grease or scale. Air pressure relief holes should be provided to allow venting of any isolated high spots.

Levelling shims

If these are to be removed after the grout has hardened, they should be treated with a thin layer of grease.

Formwork

The formwork should be constructed to be leakproof. This can be achieved by using foam rubber strip or mastic sealant beneath the constructed formwork and between joints.

In some cases it is practical to use a sacrificial semi-dry sand and cement formwork. The formwork should include outlets for pre-soaking.

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Unrestrained surface area

This must be kept to a minimum. Generally the gap width between the perimeter formwork and the plate edge should not exceed 150mm on the pouring side and 50mm on the opposite side. It is advisable, where practical, to have no gap at the flank sides.

Mixing and placing

Mixing

For best results a mechanically powered grout mixer should be used. When quantities up to 50kg are used, a slow speed drill fitted with a high shear mixer is suitable. Larger quantities will require a high shear vane mixer. Do not use a colloidal impeller mixer.

To enable the grouting operation to be carried out continuously, it is essential that sufficient mixing capacity and labour are available. The use of a grout holding tank with provision to gently agitate the grout may be required.

Consistency of grout mix

The quantity of clean water required to be added to a 25kg bag to achieve the desired consistency is given below:

Flowable : 4.75 litres

The selected water content should be accurately measured into the mixer. The total content of the Conbextra GPI grout bag should be slowly added and continuous mixing should take place for 5 minutes. This will ensure that the grout has a smooth even consistency.

Placing

At 30 °C place the grout within 20 minutes of mixing to gain full benefit of the expansion process.

Conbextra GPI 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 fill out Conbextra GPI grout with well graded silt free aggregate to minimise heat build up. Typically a 10mm aggregate is suitable. 50 - 100% aggregate weight of Conbextra GPI can be added.

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.

Typical hopper system

Removable hopper : For large pours the grout may be hand placed or pumped into a removable hopper (trough). Pouring should be from one side of the void to eliminate any air or presoaked 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 Conbextra GPI grout 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, exposed areas should be thoroughly cured. This should be done by the use of Concure curing membrane, continuous application of water and/or wet hessian.

Cleaning

Conbextra GPI grout should be removed from tools and equipment with clean water immediately after use. Cured material can be removed mechanically, or with Reebaklens.

Estimating

Packaging

Conbextra GPI grout is supplied in 25 kg single lined HDPE bags.

Yield

One bag of Conbextra GPI will yield 13.7 litres at flowable consistency.



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Storage

Shelf life

6 months if stored in a dry and well enclosed place.

Precautions

Health and safety instructions

Conbextra GPI is non toxic, but alkaline in nature. Gloves should be worn while handling this product. Splashes of grout on the skin or eyes should be washed off with clean running water. In the event of prolonged irritation, medical attention shall be sought immediately.

Additional information

For further details about the use and selection of grout refer to the Fosroc Information module entitled 'Precision grouting in the Construction industry'.

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