Conbextra HF

FOSROC constructive solutions

Shrinkage compensated cementitious precision grout

Uses

Conbextra HF is used for free flow precision grouting in a wide range of applications. These critical uses include heavy duty support beneath machine base plates, bridge bearings and crane rails.

Advantages

- Unique non-metallic dual expansion system compensates for shrinkages in both the plastic and hardened states.
- Excellent initial flow and flow retention
- High early strength facilitates rapid installation and early operation of plant
- Hydrogen free gaseous expansion
- Chloride free
- Suitable for pumping or pouring over a large range of application consistencies and temperatures

Standards compliance

Conbextra HF conforms fully to U S Corps of Engineers specification for non-shrink grout CRD-C621-89 and ASTM C1107-91 (Type C).

Description

Conbextra HF is supplied as a ready to use dry powder. The addition of a controlled amount of clean water produces a free-flowing precision grout for gap thickness up to 125mm. In addition the low water requirement ensures high early strength and long term durability.

Conbextra HF is a blend of portland cements, graded fillers and chemical additives which impart controlled expansion in both the plastic and hardened states. The filler grading minimises segregation and bleeding over a wide range of application consistencies.

Technical support

Fosroc offers a comprehensive range of high quality, high performance construction products. In addition, Fosroc offers technical support and on-site service to specifiers, end-users and contractors.

Properties

The following results were obtained at a water powder ratio of 0.19 and a temperature of 30° C.

Test		Typical result	
Compressive strength BS 1881:part 116 1983	:	20N/mm² @ 1 day 44N/mm² @ 7 days 56N/mm² @ 28 days	
Flexural strength BS 4551 : 1980	:	8N/mm² @ 28 days	
Flow characteristics (Efflux time) CRD-C Cone	:	20 - 30 seconds	
Setting time BS4550 part 3 1978	:		
	Initial set	5.5 hours	
	Final set	7.5 hours	
Time for expansion			
Plastic state		Start Finish	15 minutes Initial set
Hardended state		Start Finish	Initial set Up to 28 days
Fresh wet density		Approximately 2200 kg/m³ depending on actual consistency used.	
Young's modulus ASTM C-469-83		25N/mm²	
Expansion characteristics	:	An expansion of up to 2.5% when measured according to ASTM C827 overcomes plastic settlement in the unset material. Longer term expansion in the hardened state is designed to comply with the requirements of ASTM C1107-91 to compensate for drying shrinkage.	

Specification Clauses

Performance specification

All precision grouting (specify details and areas of application) must be carried out with a prepacked cement based product which is non-metallic and chloride free.

It shall be mixed with clean water to the required consistency and not exhibit bleed or segregation.

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A volumetric expansion of up to 2% shall occur while the grout is in a plastic state by means of a gaseous hydrogen free system. The grout must also be compensated for shrinkage in the hardened state.

The compressive strength of the grout must exceed 40 N/mm^2 at 7 days and 55N/mm^2 at 28 days.

The grout shall fully conform to the requirements of US Army Corps of Engineers Specification for non-shrink grout CRD-C621-89 or ASTM C 1107-91.

The storage, handling and placement of the grout must be in strict accordance with the manufacturer's instructions.

Supplier specification

All precision grouting (specify details and areas of application) must be carried out using Conbextra HF grout manufactured by Fosroc and used in accordance with the manufacturer's datasheet.

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 area of cleaned foundation should be flooded with fresh water. Immediately before grouting takes place, any free water should be removed. Particular care should be 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 as Conbextra HF is a free flowing grout. 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.

The unrestrained surface area of the grout 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. There should be no gap at the flank sides.

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.

It is essential that machine mixing capacity and labour availability is adequate to enable the grouting operation to be carried out continuously. This may require the use of a holding tank with provision for gentle agitation to maintain fluidity.

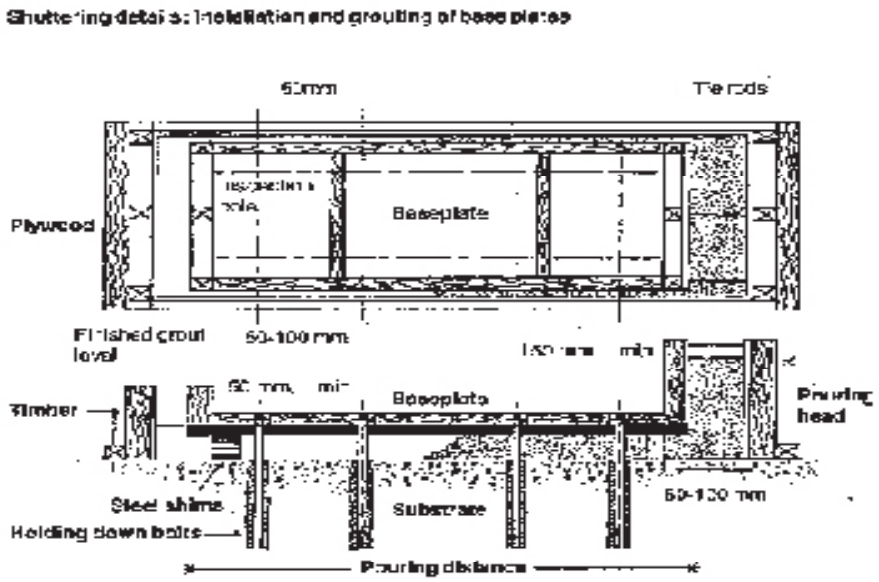
The selected water content should be accurately measured into the mixer. Slowly add the total contents of the Conbextra HF bag, mix continuously for 5 minutes, ensuring a smooth, even consistency is obtained.

Consistency of the mixed grout

To achieve the consistencies which are defined in CRD-C621, 1989, the amount of clean water that is added to a 25kg bag at 30^{0}C is :

Flowable	4.5 litres
Fluid	4.8 litres

Conbextra HF



Holding-down bolts
Non-removable : Re-bar bolt (with / without extended thread length and sleeve)
Removable: Loksleeve bolt with stud - fully sleeved
Removable: Loksleeve bolt with hexagon head, bolt, fully sleeved.
Shuttering
Timber: All timber to be 50 x 75. Bolted to the substrate or fixed to baseplate where appropriate.
Plywood: All plywood to be 20mm thick.
Levelling devices
Steel shims, elastic stools, double nuts. See note on alternative levelling devices in this datasheet.
For pouring head and pouring distances see tables in this datasheet

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		Max. flow distance in mm	
Grout consistency	Gap depth mm	100mm head	250mm head
Flowable	10	360	1200
	20	950	2600
	30	1500	3000
	40	2200	3000+
	50	3000	3000+
Fluid	10	900	2500
	20	1900	3000
	30	3000	3000+
	40	3000+	3000+

Pla ce the grout within 15 minutes of mixing to gain the full benefit of the expansion process.

Conbextra HF grout can be placed in thickness up to 125mm in a single pour.

Any bolt pockets must be grouted prior to grouting between the substrate and the base plate.

Continuous grout flow is essential.

Removable hopper : For large pours the grout may be hand placed or pumped into a removable hopper (trough).

Sufficient grout must be available prior to starting and the time taken to pour a batch must be regulated to the time taken to prepare the next one.

The mixed grout should be poured only from one side of the void to eliminate the entrapment of air or surplus presoaking water. This is best achieved by pouring the grout across the shortest distance of travel. The grout head must be maintained at all times so that a continuous grout flow is achieved.Where large volumes hve to be placed Conbextra HF grout may be pumped. A heavy duty diaphragm pump is recommended for this purpose. Screw feed and piston pumps may also be suitable.

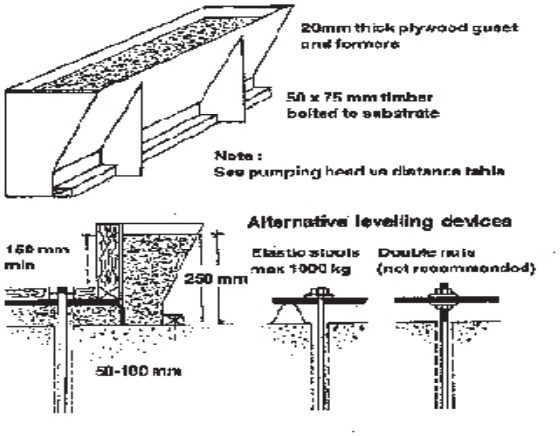

Figure 2 - Typical hopper system

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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 HF should be removed from tools and equipment with clean water immediately after use. Cured material can be removed mechanically, or with Reebaklen

Limitations

Low temperature working

When the air or contact surface temperatures are 10^0C or below on a falling thermometer warm water (30 - 40^0C) is recommended to accelerate strength development.

For ambient temperatures below 10^0C the grout consistency should be flowable and the formwork should be maintained in place for at least 36 hours.

Normal precautions for winter working with cementitious materials should then be adopted.

High temperature working

At ambient temperatures above 35^0C the mixed grout should be stored in the shade. Cool water (below 20^0C) should be used for mixing the grout.

Estimating

Packaging

Conbextra HF is supplied in 25 kg moisture resistant bags.

Yield

Allowance should be made for wastage when estimating quantities required. The approximate yield per 25 kg bag for different consistencies is

Consistency	Flowable	Fluid
Yield (litres)	13.25	13.5

Storage

Shelf life

Conbextra HF grout has a shelf life of 6 months if kept in a dry store in sealed bags. If stored in high temperature and high humidity locations the shelf life may be reduced.

Precautions

Health and Safety

Conbextra HF is alkaline and should not come into contact with skin and eyes. Inhalation of dust during mixing should be avoided. Gloves, goggles and dust mask should be worn.

If contact with skin occurs, it shall be washed with water. Splashes to eyes should be washed immediately with plenty of clean water and medical advice sought.

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