



Conbextra HF

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 shrinkage in both the plastic and hardened states.
- Excellent initial flow and flow retention.
- Rapid strength gain facilitates efficient installation and operation of plant.
- High ultimate strength and low permeability ensure durability of the hardened grout.
- 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-C621-82A and ASTM C1107-91 (Type C).

Description

Conbextra HF, shrinkage compensated cementitious precision grout, 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 thicknesses up to 125 mm. 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.

Maximum aggregate size for pumping is 2.5 mm.

Technical support

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

Properties

The following results were obtained at 23°C:

Compressive strength

BS 1881: part 116 1983:

Consistency	Water Addition per 20kg bag (Litres)	Compressive Strength (Mpa)		
		1 Day	7 Day	28 Day
Plastic	3.2 - 3.4	30	55	75
Flowable	3.4 - 3.7	25	50	65
Fluid	3.7 - 4.0	20	45	60

Note: Compressive strengths stated were obtained under controlled conditions at bottom end water. Eg the 28 day strength of 60 Mpa for fluid consistency was obtained at 3.7 litres water per 20 kg bag of Conbextra HF.

Flexural strength @ w/p of 0.19 BS 4551 1980:

- 2.5 MPa @ 1 day
- 8.0 MPa @ 7 days
- 9.5 MPa @ 14 days
- 10.0 MPa @ 28 days
- 11.0 MPa @ 180 days

Flow characteristics

(Efflux time) CRD-C Cone: 19 - 25 seconds

Setting time

BS 4550 part 3 1978:

Initial set: 5.5 hours

Final set: 7.5 hours

Time for expansion

Plastic state: **Start** 15 minutes

Finish initial set

Hardened state: **Start** initial set

Finish up to 28 days

Fresh wet density: Approximately 2200 kg/m³ depending on actual consistency used.

Young's modulus

ASTM C-469-83: 29 kN/mm²

Expansion characteristics:

An expansion of up to 2% when measured according to ASTM C 827 overcomes plastic settlement in the unset material. Longer term expansion in the hardened state is designed to comply with the requirements of ASTM C 1107-91 to compensate for drying shrinkage.



Ultimate anchorage bond stress:	Exceeds CP110 Part 1 1972, Table 22 requirements for 40 MPa concrete at 24 hours
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Specification clauses

Performance specification

All precision grouting (specify details and areas of application) must be carried out with a pre-packaged 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.

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/mm² at 7 days and 60 N/mm² at 28 days.

The grout shall fully conform to the requirements of US Army Corps of Engineers Specification for non-shrink grout CRD-C621-82A 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 manufactured by Parchem and used in accordance with the manufacturer's data sheet.

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 laitance, it must be cut back to a sound base. Bolt holes or fixing pockets must be blown clean of any dirt or debris.

Pre-soaking

Several hours prior to grouting, 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 / grout interface

It is essential that this is clean and free from oil, grease, scale, paint or coating of any kind. 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 the pre-soaking water.

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 150 mm on the pouring side and 50 mm 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. For quantities up to 50 kg a slow speed drill fitted with a high shear paddle 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 mixed grout

To achieve the consistencies which are defined in CRD-C621-82A, the amount of clean water that is added at 20°C is:

	20 kg bag
Plastic:	3.2 - 3.4 litres
Flowable:	3.4 - 3.7 litres
Fluid:	3.7 - 4.0 litres



Deeper pours

Where grout gap depth is in excess of 125 mm up to 500 mm, Conbextra Deep Pour should be used.

Maximum flow distance (mm) at 20°C

Grout consistency	Gap depth mm	100 mm head	250 mm 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+

Placing

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

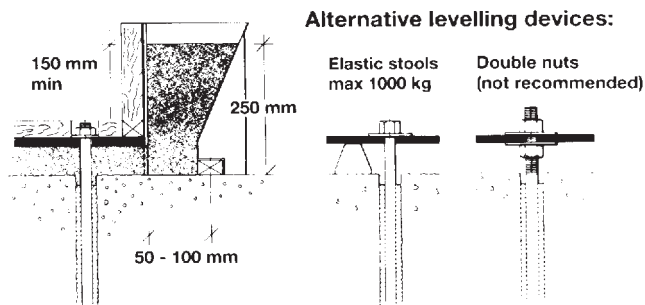
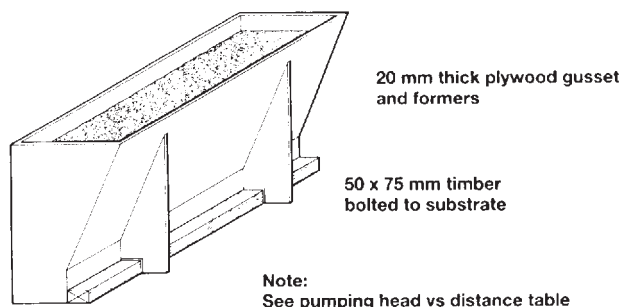
Conbextra HF can be placed in thicknesses up to 125 mm in a single pour.

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

Continuous grout flow is essential.

Figure 2: Typical hopper system

Removable hopper: For larger 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. Continual grout pour must be ensured.

The mixed grout should be poured only from one side of the void to eliminate the entrapment of air or surplus pre-soaking 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 front is achieved.

Where large volumes have to be placed Conbextra HF 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 HF should be removed from tools and equipment with clean water immediately after use. Cured material can be removed mechanically.

Limitations

Low temperature working

When the air or contact surface temperatures are 5°C or below on a falling thermometer, warm water (30-40°C) is recommended to accelerate strength development.

For ambient temperatures below 10°C 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°C the mixed grout should be stored in the shade. Cool water (below 20°C) should be used for mixing the grout.



Estimating

Supply

Conbextra HF is supplied in 20 kg moisture resistant bags.

Yield

Allowance should be made for wastage when estimating quantities required. The approximate yield for different consistencies is:

Consistency	Plastic	Flowable	Fluid
	20 kg	20 kg	20 kg
Litres / 20 kg bag:	10.59	10.80	11.04
kg/m ³ :	2220	2200	2180
No. 20 kg bags/m ³ :	94	92	90

Storage

Conbextra HF has a shelf life of 12 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 classed as hazardous under WorkSafe Australia guidelines. Conbextra HF contains cement powders which, when mixed or become damp, release alkalis which can be harmful to the skin. During use, avoid inhalation of dust and contact with skin and eyes. Wear suitable protective clothing, gloves, eye protection and respiratory protective equipment. The use of barrier creams provide additional skin protection. In case of contact with skin, rinse with plenty of clean water, then cleanse with soap and water. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. If swallowed, seek medical attention immediately – **do not** induce vomiting.

Material Safety Data Sheets are available from your local Parchem sales office. Read MSDS, data sheet and label carefully before first use of any product.

Fire

Conbextra HF is non-flammable.

Additional information

For further details about the use and selection of grouts refer to the Fosroc Information Module entitled "Precision Grouting in the Construction Industry".

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