

## Highly fluid, dual shrinkage compensated precision, cementitious grout for gaps 10mm to 125mm thickness

### Uses

Conbextra HF is used for free flow precision grouting in a wide range of applications. Typical applications include:

- Critical machine base plates, sole plates and columns
- Joints between pre-cast concrete panels
- Pumped grouting applications
- Grouting applications where pouring access is restricted

### Advantages

- 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

### Standards Compliance

AS 1478.2-2005 Appendix E Early Volume Change

AS 1478.2-2005 Table 4.1.2.2 Consistency

### Description

Conbextra HF, dual 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

Safari offers a comprehensive range of high performance, high quality construction products. In addition, the company offers a technical support package to specifiers and contractors as well as technical advice from staff experienced in the construction industry.

### Specification Clauses

#### Supplier specification

All precision grouting (specify details and areas of application) must be carried out using Conbextra HF manufactured by Safari and used in accordance with the manufacturer's current Technical Data Sheet.

#### Performance specification

To the nominated area(s) (specify details and areas of application), grouting must be carried out using a pre-packaged, non-metallic and chloride free, dry powder blend of cements, graded fillers and chemical additives.

It is to be mixed with clean water to the required consistency. The plastic grout must not bleed or segregate. The storage, handling and placement of the grout must be in strict accordance with the manufacturer's instructions.

A positive volumetric expansion up to 3% shall occur while the grout is plastic by means of a gaseous, hydrogen free system. Additionally the grout is to be formulated to compensate for longer term expansion in the hardened state.

It shall exhibit Flow Characteristics when tested to AS 1478.2.2005 of 10 - 30 seconds using the flow cone procedure.

The compressive strength of the grout must exceed 40MPa at 7 days and 60MPa at 28 days.

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## Properties

Test Method	Standard	Result				
<b>Compressive Strength</b>	AS 1478.2:2005	Consistency	Water Addition	1 Day	7 Days	28 Days
		Stiff	2.6-3.4	50	68	77
		Plastic	3.4-3.6	38	53	64
		Flowable	3.6-3.8	31	48	62
		Fluid	3.8-4.0	27	46	60
<b>Bond Strength by Pull Off</b>	EN 1542:1999	2.6MPa				
<b>Chloride ion Content</b>	EN 1015-17:2000	0.004%				
<b>Fire Rating</b>	EN 13687-1:2002	Class A1 Non-Combustible				
<b>Flexural Strength (Modulus of Rupture)</b>	AS 1012.11 - 2000	1 Day 7 Days 28 Days	3.2 MPa 9.5 MPa 10.0 MPa			
<b>Indirect Tensile Strength</b>	AS 1012.10.2000	1 Day 7 Days 28 Days	2.5 MPa 4.5 MPa 4.7 MPa			
<b>Setting Time</b>	AS 1012.18:1996	5.5 hours - initial set 7.5 hours - final set				
<b>Fresh Wet Density</b>		2200 kg/m <sup>3</sup> - depending on consistency used				
<b>Alkali reactive particles</b>	Rapid Mortar Bar Test (RTA T363)	Non-reactive				
<b>Flow Characteristics</b>	AS 1478.2:2005	19-25 seconds (Flow Cone)				
<b>Minimum Thickness</b>		10mm				
<b>Maximum Thickness</b>		125mm				

Clarification of property values: The typical properties given above are derived from laboratory testing. Compressive strengths stated above were measured using cube samples. Test results obtained will vary if carried out to an alternative standard or sample dimensions are used.

Note: Compressive strengths stated were measured at bottom end water, eg., the 28 day strength of 62 MPa for flowable consistency was obtained at a water addition of 3.6 litres water per 20kg bag of Conbextra HF.

## Test Results to ASTM Specification C1107: 2001

Test Method	Standard	Result	
<b>Flow Consistency</b>	ASTM C1437:2007	145%	
<b>Setting Time</b>	ASTM C191:2008	Initial: Final:	5.75 hours 6.75 hours
<b>Plastic Volume Change</b>	ASTM C827:2010	+0.57%	
<b>Hardened Volume Change</b>	ASTM C1090:2010	1 day 3 days 14 days 28 days 56 days	0.12% 0.12% 0.12% 0.12% 0.10%
<b>Compressive Strength</b>	ASTM C109:2011b	1 day 3 days 7 days 28 days	34.4 MPa 53.5 MPa 63.7 MPa 70.1 MPa

Note: All tests were carried out at 25°C ± 2°C until the age of the test. All above test results are independent third party results. Copies of these test results are available on request. The tests were carried out at a water addition rate of 3.6 litres per 20kg.

## Flow properties of mixed grout

The flow distances given below in (mm) are intended as a guide. Actual flow distances will vary depending on site conditions:

Gap Depth (mm)	Flowable 100mm head (mm)	Flowable 250mm head (mm)	Fluid 100mm head (mm)	Fluid 250mm head (mm)
10	360	1200	900	2500
20	950	2600	1900	3000
30	1500	3000	3000	3000+
40	2200	3000+	3000+	3000+
50	3000	3000+	-	-

## Preparation

### Foundation surface

The substrate surface must be free from oil, grease or any loosely adherent material. Concrete laitance should be removed using low impact scabbling or with needle guns to the degree where aggregate is starting to show.

Bolt holes or fixing pockets must be blown clean of any dirt or debris. Bolt holes should also be roughen up using mechanical means.

### 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 Construction Silicone\* 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

A forced-action mixer is essential. Mix for 3 to 5 minutes at a slow speed (400/500 rpm) in a suitably sized drum using appropriate equipment such the Ransom MDR59 140 x 600 M14 Helical mixing paddle (product code: N4020892-UNIT) fitted to a heavy-duty 1600W mixer, such as Ransom RAN160 (product code: NP7AN160-UNIT ) or equivalent.

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 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.

### Deeper grout pours

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

## 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 from 10 mm up to 125 mm in a single pour when used as an underplate grout. Where the grouting gap beneath the base plate exceeds the maximum thickness allowed, then the grout can filled / bulked out with Conbextra Grout Aggregate\* to minimise exotherm heat build up. Alternatively Conbextra Deep Pour is available for pours up to 500 mm thick.

Filling/bulking out of the grout should not exceed a ratio of 1:1. Please refer to the Conbextra Grout Aggregate TDS for more guidance on bulking out of cement based grouts.

Any bolt pockets must be grouted prior to grouting between the substrate and the base plate. Continuous grout flow is essential.

# Fosroc® Conbextra® HF

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.

Please refer to the Conbextra Cementitious Grouts Application Guide for further information. This is available from the website or your local distributor.

## Pumping

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. Maximum aggregate is 2.5 mm. Ensure pump is capable of pumping this size aggregate.

## Curing

On completion of the grouting operation, exposed areas should be thoroughly cured. This should be done by the use of Concure A99 curing membrane 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	20 kg bags.
Material code:	FC501050-20KG

### Yield

Consistency (AS 1478.2-2005 Table 4.1.2.2)	Yield / 20 kg bag (Litres of mixed material)
Stiff	10.4 litres
Plastic	10.7 litres
Flowable	10.8 litres
Fluid	10.9 litres

### Storage

Conbextra HF has a shelf life of 24 months from date of manufacture if kept in a dry store in the original, unopened bags. Refer to the Use by Date indicated on the packaging. If stored in high temperature and high humidity locations the shelf life may be reduced.

### Important notice

A Safety Data Sheet (SDS) and Technical Data Sheet (TDS) are available from the supplier website or upon request from the nearest sales office. Read the SDS and TDS carefully prior to use as application or performance data may change from time to time. In emergency, contact any Poisons Information Centre (phone 13 11 26 within Australia) or a doctor for advice.

### Product disclaimer

This Technical Data Sheet (TDS) summarises our best knowledge of the product, including how to use and apply the product based on the information available at the time. You should read this TDS carefully and consider the information in the context of how the product will be used, including in conjunction with any other product and the type of surfaces to, and the manner in which, the product will be applied. Our responsibility for products sold is subject to our standard terms and conditions of sale. Fosroc does not accept any liability either directly or indirectly for any losses suffered in connection with the use or application of the product whether or not in accordance with any advice, specification, recommendation or information given by it.

