Fosroc® Conbextra HS

Technical Data Sheet

High flow, high ultimate strength, dual shrinkage compensated, precision cementitious grout

Uses

Heavy duty precision grouting of gaps from 10mm to 125mm, where high flow and high ultimate strength is required. Applications include grouting of:

- Baseplates and soleplates of large machines subject to moderate dynamic loads
- Crane rail soleplates
- Precast wall panels, beams, columns and structural building members

Advantages

- Non-metallic dual expansion system compensates for shrinkage in both the plastic and hardened states
- Excellent initial flow and flow retention suitable for large and small grout pours
- 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 HS conforms to AS1478.2-2005 Appendix E test for early volume change and AS1478.2.2005 (table 4.1.2.2) for workability.

Technical Support

Parchem 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.

Description

Conbextra HS, shrinkage compensated ultra high-strength 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 HS 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 1.0 mm.

Specification Clauses

Supplier specification

All precision grouting (specify details and areas of application) must be carried out using Conbextra HS manufactured by Parchem and used in accordance with the manufacturer's 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 of 1-2% shall occur while the grout is plastic state by means of a gaseous, hydrogen free expansion. Additionally the grout is to be formulated to compensate for longer term expansion in the hardened state, to compensate for drying shrinkage.

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 75MPa at 7 days and 95MPa at 28 days.

Fosroc® Conbextra HS

Properties

Test Method	Standard	Result						
Compressive Strength	AS 1478.2:2005 Tested at 23°C	Consistency	Water Addition	8 hrs MPa	12 hrs MPa	1 Day MPa	7 Days MPa	28 Days MPa
		Flowable	2.7L	5	20	55	75	95
		Fluid	3.0L	-	13	40	65	80
	AS 1478.2:2005 Tested at 30°C	Consistency	Water Addition	8 hrs MPa	12 hrs MPa	1 Day MPa	7 Days MPa	28 Days MPa
		Flowable	2.7L	26	40	60	85	95
		Fluid	3.0L	20	30	50	70	80
Bond Strength by Pull Off	EN 1542:1999	2.6MPa						
Chloride ion Content	EN 1015-17:2000	0.004%						
Fire Rating	EN 13687-1:2002	Class A1 Non-combustible						
Flexural Strength (Modulus of Rupture)	AS 1012.11 - 2000	1 Day 7 Days 28 Days	5.8 MPa 11.4 MPa 13.7 MPa					
Indirect Tensile Strength	AS 1012.10.2000	1 Day 7 Days 28 Days	3.6 MPa 5.1 MPa 7.0 MPa					
Setting Time	AS 1012.18:1996	2.5 hours - initial set 5.0 hours - final set						
Fresh Wet Density		2350 kg/m³ - depending on consistency used						
Alkali reactive particles	Rapid Mortar Bar Test (RTA T363)	Non-reactive						
Flow Characteristics	AS 1478.2:2005	600mm (Flow Trough)						
Expansion Characteristics	AS1478.2-2005 ASTM C1107-91	An expansion of up to 2% overcomes plastic settlement Conforms to expansion in hardened state for drying shrinkage						
Minimum Thickness **Maximum Thickness**		10mm 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 addition.

Test Results to ASTM Specification C1107: 2001

Test Method	Standard	Result	
Flow Consistency	ASTM C1437:2007	128%	
Setting Time	ASTM C191:2008	Initial: Final:	3.6 hours 4.4 hours
Plastic Volume Change	ASTM C1090:2010	+1.22%	
Hardened Volume Change	ASTM:C827:2010	1 day 3 days 14 days 28 days 56 days	0.25% 0.28% 0.28% 0.28% 0.26%
Compressive Strength	ASTM C109:2011b	1 day 3 days 7 days 28 days	55.8 MPa 77.4 MPa 83.5 MPa 90.1 MPa

Note: All tests were carried out at 25°C ± 2°C until the age of the test. 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 2.7L per 20kg.

Consistency 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+

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 HS 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

For best results a mechanically powered grout mixer should be used. When quantities up to 40 kg are used, a slow speed drill fitted with a high shear mixer with a minimum 1200W and between 300-650 rpm. The Protool MXP 1602 E mixer (product code: TT-621941) or equivalent is recommend with the Protool HS2 140 x 600 M14 Helical mixing paddle (product code: TT-614217) 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 HS 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 HS 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.

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.

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.

Fosroc® Conbextra HS

Pumping

Where large volumes have to be placed Conbextra HS 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
1.0 mm. Ensure the selected 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 curing membrane, continuous application of water and/or wet hessian.

Cleaning

Conbextra HS 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

202000 - Conbextra HS 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	Flowable	High Flow
Litres / 20 kg bag:	9.8	10.1
kg/m³:	2370	2280
No. 20 kg bags/m³:	102	99

Storage

Conbextra HS 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.

Parchem Construction Supplies Pty Ltd
7 Lucca Road, Wyong NSW 2259
Phone: 1300 737 787
www.parchem.com.au
ABN 80 069 961 968

Distributed in New Zealand by: Concrete Plus Ltd
23 Watts Rd, Sockburn 8042 Ph: 03 343 0090