

PENATECH HS GROUT *plus*

Very High Strength Class C Cementitious Grout

DESCRIPTION

Aftek Penatech HS Grout *plus* is a high strength, precision Class C grout. Non shrink dual expansion compensates for shrinkage in both the plastic and hardened state.

Penatech HS Grout *plus* complies with US Corp of Engineers Specification of non-shrink grout, CRDC 621-82A and ATSM C1107-91 (Type C).

RECOMMENDED USES

- Machine base plates where critical grouting application is required
- Applications subject to dynamic loads and where continuous vibrations is present
- Bridge bearing pads
- Crane rail sole plates
- Pre-cast concrete sections/ panels
- Anchor bolt fillings
- Filling in core holes, cavities, gaps and base infill's
- High performance structural grouting

FEATURES AND BENEFITS

- High early and ultimate strength
- Exceptional flow characteristics, good flow retention
- High ultimate (28 day) strength
- Shrinkage compensated in both plastic and hardened state
- Non-metallic wires content eliminates staining
- Complies with ASTM C1107-91 and CRDC-621-82
- Good impact and thermal resistance
- Can be dry packed

APPLICATION INSTRUCTIONS

Surface and Substrate Preparation-

The substrate to be grouted must be clean, sound and free from dust, oil, grease, curing compounds or any foreign matter that will affect the grout adhesion bond. Bolt holes and anchor points must be clean and free of water.

Pre-Soaking-

All prepared areas must be saturated with water for a minimum of 4 hours prior to grouting. This will reduce the porosity of the substrate.

Prior to grouting, ensure all excess water is removed and all holes must be free from water and no puddles of water are present.

If grouting under base plates, it is imperative that bleed holes or venting holes are provided (this will eliminate pressure build up in a confined area).

Formwork-

It is essential that the formwork to be constructed is leak proof and water tight. In order to achieve this it is recommended that foam rubber strips or a suitable sealant such as polyurethane or silicone be used underneath the formwork.

The formwork should be constructed, which will allow and ensure a grout head is maintained on the side above the level of the underside at the base plate. The formwork should allow for gravity flow of grout with a suitable grout head allowing for continuous flow between the base plate and the concrete substrate.

To ensure ease of formwork removal, the formwork should be coated with form oil or release oil prior to grouting (consult ITLS-Aftek Technical Department for additional information).

Large Volume Grouting-

For grouting requiring thicknesses greater than 200mm, special procedures are necessary, such as the addition of Epilox Fillers or 10mm Silt Free aggregate can be used.

Consult your AFTEK/ITLS representative for advice and additional information.

Temperature-

Low Temperature Application:

At low temperatures below 10°C, the grout setting time is extended and some bleeding may occur. The early strength gain will be dramatically reduced. However, ultimate strength will be maintained. It is recommended that the Penatech HS Grout *plus* and the water be conditioned to 20-25°C overnight or several hours before application. This will assist in strength development.

High Temperature Application:

At high temperatures greater than 30°C, the grout setting time is reduced and grouting application becomes problematic due to very early setting times and reduced placement times.

It is recommended that Penatech HS Grout *plus* be kept in a cool environment and the use of cold water be used for mixing. It is recommended that in instances where the temperature is greater than 30°C, the grouting be conducted early in the day or late in the evening and sheltered from sunlight and direct heat.

Mixing-

Penatech HS Grout *plus* is ready to use, simply requiring the addition of water.

Penatech HS Grout *plus* must be mixed with a mechanical mixer with a high shear mixer or a suitable drum mixer that creates a forced action mixing.

For smaller quantity mixing, an electric drill with a spiral mixing paddle is suitable. The speed drill should be approx. 500-600 rpm.

DO NOT MIX BY HAND.

Dry Pack/ Stiff Grout:	Add 2.2 – 2.6 litres per 20kg bag
Plastic/ Trowellable Grout:	Add 2.8 – 3.2 litres per 20kg bag
Flowable/ Pourable Grout:	Add 3.5 – 4.0 litres per 20kg bag

Always add the grout powder to the pre-measured water. DO NOT ADD ADDITIONAL WATER AS GROUT WILL SEGREGATE AND BLEED AFFECTING PERFORMANCE.

The selected water level should be accurately measured and added to a suitable mixing container.

Add the powder (grout) to the water and mix for 3-5 minutes until a homogeneous consistent mix is obtained.

DO NOT ADD ADDITIONAL WATER OTHER THAN SPECIFIED ABOVE. DISCARD ANY GROUT THAT HAS STIFFENED OR IS UNWORKABLE.

FLOW PROPERTIES-

Mixed 4 litres of water per 20kg bag at 20°C

FLOW PROPERTIES			
Grout Consistency	Gap Depth (mm)	100mm head of grout Flow distance (metres)	250mm head of grout Flow distance (metres)
Fluid/ Flowable	10	0.950	2.80
	20	2.00	3.30
	30	3.10	3.50
	40	3.40	> 3.50
	50	> 3.80	> 3.80
	100	> 4.00	> 4.00

Grout head refers to headbox required for a continuous pour as to avoid air pockets under the base plate as well improve flow.

Care must be taken during grouting to ensure the headbox and grout head is maintained at all times.

The grout head nominated (100mm or 250mm) will ensure that a continuous and consistent flow is achieved.

Placement-

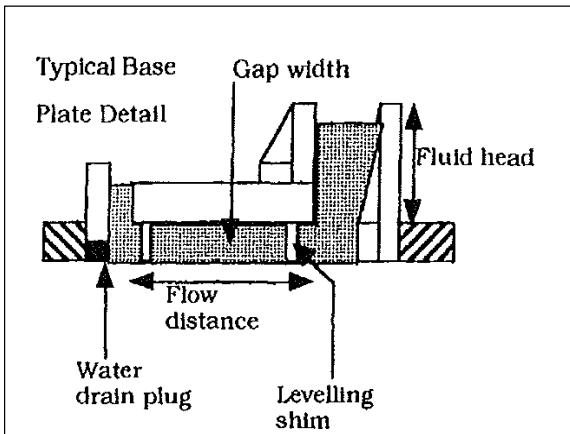
Penatech HS Grout *plus* can be placed in two different ways:

1. Gravity flow using header box-

Mix the grout to a flowable consistency and pour grout from one side to avoid air entrapment. Ensure a grout head box is used and the grout head is maintained at all times. This will ensure continuous flow of grout without the possibility of air entrapment.

2. Large volume pumping-

Mix the grout using a forced action mixer. A positive displacement pump is the recommended pump for large placement application. For large grout pours ensure the grout is pumped from the bottom upwards as this will minimize any air entrapment and ensure complete void filling. For base plates pump from one side ensuring an air bleeder hole is available in the formwork or base plate to ensure any build-up of pressure is released from the bleeder hole.



DRAWING 1.1

Curing-

On completion of grout application, all exposed grout should be cured in accordance to 'good practices' in concrete curing. The exposed grout should be covered with plastic sheeting, wet hessian or wet liquid curing compounds such as the Curecon range at Aftek Curing Compounds. Consult your Aftek representative for advice on the most suitable product.

Curing plays a vital role in ultimate grout performance and strength development.

TYPICAL PROPERTIES	
Appearance	Light grey powder (grey when mixed)
Application Temp	Minimum 5° C Maximum 30° C
Expansion characteristics	Expansion 1-2% in plastic state
Time for Expansion	Start 5 min Finish 25 min
Bleed	0%

SETTING TIMES		
Water Requirement (litres per bag)	Trowellable 2.8 – 3.2	Flowable 3.5 – 4.0
Initial Set (hours)	2.0	2.5
Final Set (hours)	3.5	4.0
Tested at 20°C 50% RH Tested to AS 1012.18 for setting times		

COMPRESSIVE STRENGTH				
Age	Compressive Strength MPa		Flexural Strength MPa	
	Trowellable	Flowable	Trowellable	Flowable
1 day	>45	>35	>4.0	>3.9
3 days	>70	>45	>5.5	>6.5
7 days	>80	>65	>8.8	>7.0
28 days	>95	>85	>9.8	>9.5
Tested AS 1012.9 and AS2350-11 at 20°C for compressive strength. Tested to ASTM C348-86 at 20°C for flexural strength				

BOND STRENGTH		
Age (Days)	Trowellable MPa	Flowable MPa
28	>9.5	>10
Tested to ASTM C882-1987, Slant shear method.		

YIELDS		
Consistency	Trowellable	Flowable
litres of water - per 20kg bag	2.8 – 3.2	3.5 – 4.0
Yield - per bag litres	10.2 approx.	11 approx.
Fresh wet density kg/m ³	2220	2200
Bags required – per cubic metre (m ³)	98	91

SPECIFICATION CLAUSES

Performance specification-

All grouting shown on the drawing 1.1 must be carried out with a pre-packaged cement based grout which is chloride free.

It shall be mixed with clean water to the required consistency. The plastic grout must not bleed or segregate.

A positive volumetric expansion shall occur while the grout is plastic by means of a gaseous system. The compressive strength of the grout must exceed 60 MPa at 7 days and 80 MPa at 28 days.

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

Supplier's specification-

All grouting where shown on the drawing must be carried out using as manufactured by Aftek and used in accordance with the manufacturer's data sheet.

PACKAGING

Penatech HS Grout *plus* is supplied in 20kg poly lined bags. Item No. 205047

STORAGE-SHELF LIFE

Penatech HS has shelf life of 9 months if stored in the original sealed packaging in dry, low humid environments.

PRECAUTIONS

- Unrestrained area must be kept to a minimum
- Do not add additional water other than what is specified
- Never apply mixed grout to a dry porous substance
- Refer to MSDS (material safety data sheet) prior to mixing
- Always apply grout in a continuous operation ensure grout head is maintained
- At low temperatures, grout setting time and strength gain will be extended
- At very high temperatures, grout will set and cure faster potentially causing cracking and delamination

For more detailed information, please read the MSDS for this product.

CLEAN UP

Wash all tools and equipment with fresh, clean water immediately after use. Penatech HS Grout *plus* can only be removed mechanically.

HEALTH AND SAFETY

Avoid contact with skin. Protective gloves and clothing are recommended when mixing or using this product. Please refer to full MSDS (material safety data sheet) for this product, which is available from Aftek upon request or through www.aftek.com.au

TECHNICAL SUPPORT

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

Please contact your ITLS-Aftek sales representative or Head Office for this service.

The information and any recommendations relating to the application and end-use of all ITLS products are provided in good faith based on ITLS's knowledge and experience of the products. In applications, the differences in materials, and variances of substrates and actual site conditions can vary such that no warranty in respect of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be taken as inferred either from this information, or from any written recommendations, or from any other advice offered by ITLS. The proprietary rights of third parties must be observed. All orders are accepted subject to our sale terms and conditions. All users should always refer to the most recent and up to date issue of the Technical Data Sheet for the product concerned, which is available on request. It is recommended that products should always be properly stored, handled and applied under tested and recommended conditions. PLEASE CONSULT OUR TECHNICAL DEPARTMENT FOR FURTHER INFORMATION.