MAKRETE
BUILDING SOLUTIONS

TECHNICAL DATA SHEET

MAKGROUT GP

High-Performance General-Purpose High Strength Class A Non-Shrink Grout

Makgrout GP is a high-performance high flow shrinkage compensated Class A construction grout based on a blend of Portland cement, high quality graded aggregates and additives, which control expansion whilst the grout is in a plastic state.

Makgrout GP is used when it is essential to eliminate shrinkage in the plastic state when completely filling voids or grouting between a base plate and substrate.
The addition of a controlled amount of clean water produces a flowing shrinkage compensated grout for gap thicknesses from 10mm up to 175mm.

RECOMMENDED USES

- Ideal for bedding in pre-cast panels
- Filling in around anchor bolt cavities
- Suitable for filling in block work
- High ultimate strength and low permeability ensure the durability of the hardened grout
- Can be dry packed, troweled, poured, and pumped
- Suitable for filling in core holes or concrete penetrations
- Can be used as an underpinning grout, beneath concrete sections

FEATURES AND BENEFITS

- The Gaseous expansion system compensates for shrinkage and settlement in the plastic state
- Pre-packaged material overcomes potential on-site mixing variations
- Develops high early strength without the use of chlorides
- Grouting from 10mm to 175mm in a single application
- Maximum aggregate size 0.75mm for pumping
- No metallic particles to cause staining
- Australian Made and Australian Owned

APPLICATION INSTRUCTIONS
SURFACE PREPARATION

For maximum bond, surfaces should be abraded or roughened, preferably by mechanical means such as needle gun, grit blasting, grinding. The substrate to be grouted must be clean, sound, and free from dust, oil, grease, curing compounds or any foreign matter that may affect the grout adhesive bond. Any cavities substrate can be damp but not wet. Bolt holes and anchor points must be clean and free of ponding water.

BASE PLATE INSTALLATION

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.

FORM WORK

The formwork used must be constructed to avoid any grout leakage hence the formwork must be leakproof.
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.
The form work should be coated with form oil or a bond breaker coating prior to grouting (Consult Makrete Technical Department for additional information).
To ensure the formwork is leak proof a suitable sealant such as Silicone should be used to seal all exposed sides of the formwork to eliminate grout leaking.

SUBSTRATE PREPARATION

Pre-soak all prepared areas with water for a minimum of 2 hours prior to grouting. This will reduce the porosity of the substrate.
Prior to grouting, any free or excess water must be removed, and all holes must be free from water and no ponding of water are present in area to be grouted.
If the grout is to be used under base plates ensure that bleed/venting holes are incorporated to safeguard from pressure build up in the confined area.

MIXING

Measure accurately the required water level for the selected grout consistency in a suitable mixing bucket.
Add the **Makgrout GP** to the gauged water and mix while adding the powder.
This can be achieved by using a forced action mixer with approximately 600 to 800 rpm speed and a helical mixing paddle.
Mix for 4 to 5 minutes until a consistent uniform mix is obtained. If too much water is added the product will segregate and result in a water layer on the surface which will affect the structural integrity of the grout.

- Any grout that is unworkable or has set or hardened should be discarded and not to be re-used
- Grout should not be mixed by hand
- Do not use mechanical vibrators to assist flow

Unrestrained grout must be kept to a minimum.

MAKGROUT GP MIXING CONSISTENCY

Required Consistency	Litres of water added per 20kg bag	Yield - Litres of mixed material
Stiff*	2.7 – 2.9	10.2
Plastic	3.0 - 3.4	10.7
Flowable	3.5 - 4.0	11.0

*Stiff consistency also refers to dry pack.

Grout Placement

At 20°C place the grout within 30 minutes of mixing to gain full benefit of the expansion process.
Makgrout GP can be placed in thicknesses from 10mm up to 175mm 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 be filled / bulked out with **Makrete Filler M4/M6** to minimise exotherm heat build-up.
Filling/bulking out of the grout should not exceed a ratio of 2:1 grout: aggregate (**Makrete Filler M4/M6)** by weight.
Continuous grout flow is essential. Sufficient grout must be prepared before starting. The time taken to pour a batch must be regulated to the time to prepare the next batch.

MAKGROUT GP CAN BE APPLIED USING VARIOUS APPLICATION TECHNIQUES.

GRAVITY FLOW USING A GROUT HEADER BOX

Makgrout GP can be placed in thicknesses from 10 -175mm in a single application.

Mix the grout to a flowable consistency and pour the grout from one side to avoid air entrapment.

Pouring should be from one side of the void to eliminate any air or pre-soaking water becoming trapped under the baseplate. It is advisable to pour the grout across the shortest distance of travel. The grout head must be always maintained so that a continuous grout front is achieved with no air entrapment.

Grout is mixed using an electric drill with a forced action mixing blade.

Ensure a grout header box is used and the grout head volume is always above the outlet of the header box.

This will ensure continuous flow of grout without the possibility of air entrapment. If the grout level drops below the outlet port, air will be entrained, and this may affect the structural integrity of the grout.

MIXING LARGE VOLUMES

Using a heavy-duty grout pump which has forced action mixing blades. Mix the grout for 5 minutes ensuring a uniform and homogeneous mix.

Where large volumes must be placed **Makgrout GP** may be pumped. A heavy-duty diaphragm pump is recommended for this purpose. Screw feed and piston pumps may also be suitable. Maximum aggregate size for pumping is 0.75mm. Ensure the selected pump can pump this size aggregate.

When pouring large sections, the grout is pumped from the base of the formwork. For column applications the inlet poured is positioned on the bottom of the column and grout pumped from the base up. By pumping from the base of the column this will minimise any air entrapment.

An air release hole is normally positioned at the top of the column to avoid pressure build up and eliminate air entrapment.
For continuous pumping Makrete recommend Putzmeister S5 or Putzknecht S30 pumps or similar.

APPLICATIONS - LIMITATIONS

LOW TEMPERATURE WORKING/MIXING

When the air or substrate surface temperatures are 5°C or below, warm water (30 - 40°C) is recommended to accelerate strength development.
For ambient temperatures below 10°C the formwork should be kept in place for at least 48 -72 hours.
Normal precautions for winter working with cementitious materials should then be adopted. At low temperatures the grout will take longer to cure and reach maximum strength gain.
Unrestrained grout must be kept to a minimum.

HIGH TEMPERATURE WORKING/MIXING

At ambient temperatures above 35°C cool water (below 20°C) should be used for mixing the grout prior to placement.
At high temperatures the grout will set and cure faster, working time will be reduced.

- Unrestrained areas 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 material safety data sheet prior to mixing
- Always apply grout in a continuous operation to ensure grout head is maintained

CURING

To obtain maximum performance on completion of the grouting operation, exposed areas should be thoroughly cured. This should be done using **Makrete** curing membrane or continuous application of water and/or wet hessian.

PACKAGING

Makgrout GP is supplied in 20kg poly lined bags.

SHELF LIFE

Makgrout GP has shelf life of 12 months if stored in the original sealed packaging in dry, low humid environments.
Do not use if there are any lumps in the product.

CLEAN UP

Makgrout GP should be removed from tools and equipment with clean water immediately after use. Cured material can only be removed mechanically.

HEALTH AND SAFETY INFORMATION

Avoid contact with skin. Protective gloves and clothing are recommended when mixing or using thisproduct. Please refer to full Safety Data Sheet for this product, which is available from Makrete Building Solutions.

TECHNICAL SPECIFICATIONS
PERFORMANCE CHARACTERISTICS

TEST	STANDARD	TYPICAL PROPERTIES (RESULTS) MPa				
Compressive Strength MPa	AS 1478.2:2005 AS 1012-11	Consistency	Water Addition	1 Day	7 Days	28 Days
		Stiff	2.7 - 2.9	40	70	85
		Plastic	3.0 - 3.4	35	60	80
		Flowable	3.5 - 4.0	30	55	70
Flexural Strength (Modulus of Rupture)	AS 1012.11 - 2000	1 Day 7 Days 28 Days	4.1 MPa 8.7 MPa 12.8 MPa			
Indirect Tensile Strength	AS 1012.10.2000	1 Day 7 Days 28 Days	4.0 MPa 6.0 MPa 6.5 MPa			
Setting Time	AS 1012.18:1996 ASTM C191-2008		Initial Set @ 20°C	Final Set @ 20 °C	Litres of water per bag	
		Stiff	1.5 hours	3.5 hours	2.7 - 2.9	
		Plastic	3.0 hours	4.5 hours	3.0 - 3.4	
		Flowable	5.0 hours	7.0 hours	3.5 - 4.0	
Fresh Wet Density	AS1012.5	Approx. 2200 kg/m³ - depending on consistency mixed				
Minimum Thickness Maximum Thickness		10 mm 175 mm				
Flow Consistency	CRDC-621-82	30 – 40 seconds using CRDC Flow Cone				
Working Time	AS1012.18	30 – 40 minutes @ 20°C				
Bond Strength	ASTM C882-1987 Slant Shear Method	>12 MPa @ 28 days				
Expansion Characteristics	In a plastic state ASTM C940	1 – 2% in plastic state Expansion Starts after 5 minutes Finishes in 2 hours				
Application Temperature		Min 10 °C Max 30 °C				
Bleed		0				

YIELDS

Consistency	STIFF	PLASTIC	FLOWABLE
Water per 20 kg bag - LITRES	2.7 - 2.9	3.0 - 3.4	3.5 - 4.0
Yield per 20 kg bag - LITRES	10.2	10.7	11.0
Fresh Wet Density in kg/m3	2250	2210	2200
Bags required per cubic metre (m^3)	97 Bags	94 Bags	91 Bags

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Product	MAKGROUT GP
Issue Date	AUG 2022
Issue No:	1
Item Code	MAKG21
Pack Size	20 kg Bag