MASTER® BUILDERS SOLUTIONS

Application Guide

Epoxy Grouts

MasterFlux ER systems

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GENERAL

This application guide applies to the MB Solutions Australia Pty Ltd, epoxy grout ranges, known as MasterFlux ER brand family (formerly MasterFlow). This application guide shall be read in conjunction with all project specifications (including drawings) -by others- and the current material Technical Data Sheets (TDS) and Safety Data Sheets (SDS).

Products Info

Renamed Brand	Formerly as	Pack size	Ratio	Min-max thickness	Yield
MasterFlux ER 618	MasterFlow 618	10kg kit	Part A: 9.1kg Part B: 0.9kg	5-50mm	5.9L
MasterFlux ER 628	MasterFlow 628	10kg kit	Part A: 9.0kg Part B: 1.0kg	5-50mm	5.9L
MasterFlux ER 648	MasterFlow 648	23.54kg kit	Part A: 2.54kg Part B: 1.0kg Part C: 20.0 kg	<150mm	High flow: 11.8L
		114.16 kg kit	Part A: 10.16kg Part B: 4.0kg Part C: 4x20kg	<150mm	High flow: 49.6L
		114.16 kg kit	Part A: 10.16kg Part B: 4.0kg Part C: 5x20kg	<150mm	Standard flow: 57.0L

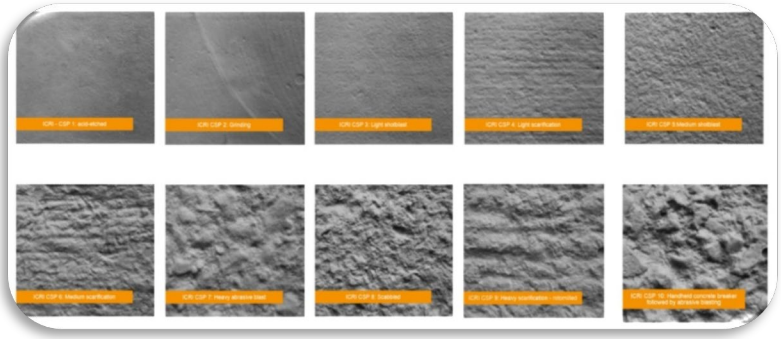
Application Requirements

- **Training:** All work shall be carried out by adequately trained and skilled applicators/installers, under appropriate supervision.
- **Safety:** Always ensure the appropriate use of adequate PPE (gloves, goggles, long sleeves etc) and comply with all other safety related requirements when applying Master Builders Solutions materials.
- **Quality Systems:** The applicator shall operate under a fully compliant quality system, to ensure the on-site quality of applied material. The applicator shall keep fully documented work records for all works undertaken.
- **Quality Control:** If after application and/or testing, any applied material is deemed as unsatisfactory by the specifying consulting engineer and/or MB Solutions Australia Ltd, it may need to be rectified at the applicator's cost.
- **Storage:** Grout components shall be stored between 10°C and 30°C. Note the restrictions on hot and cold weather grouting sections.

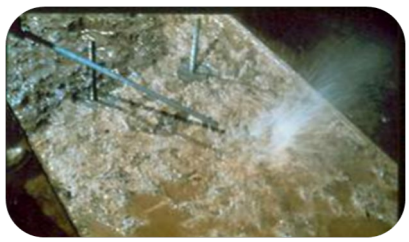
APPLICATION- PREPARATION

Foundation Preparation

- The foundation surface must be free of all laitance and unsound material and thoroughly cleaned and cured. Covering the surface simplifies cleaning before grouting and reduces costs.
- The grout foundation should be roughened as specified. Roughen the grout foundation as specified. Recommended profiles: CSP 3: 2-5mm (minimum); CSP 5: 3-10mm (maximum).
- The concrete surface may be uniformly roughened before it has set by the use of a nail rake in one direction only.

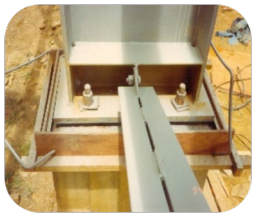


- Use of a bull float, Darby, broom, or wood float finish, or scratching at random with a garden rake or trowel is NOT recommended.
- After the concrete hardens, handheld, pistol grip pneumatic hammers with chisel point heads are recommended for roughening to remove laitance and loose material to ensure a good bond.
- Large paving breakers fitted with bush hammers, spade or chisel bits, are NOT recommended.



- Where grout will extend horizontally beyond the edge of the plate or object grouted, the foundation must also be prepared below these areas to help assure bond.
- Before setting structural elements or machinery, all of the areas of the foundation, which will be in contact with the grout, including anchor bolt holes, must be thoroughly cleaned. Remove any oil, grease, and curing membrane.
- One method of cleaning a concrete surface is the use of compressed air and water. Continue cleaning until water runs clear.

Forming



- Forms should be watertight robust enough to resist the hydraulic pressure generated by plastic, flowable, or fluid grout, ensuring no leakage occurs during placement.
- When placing the grout, ensure all formwork extends at least 25 mm vertically above the underside of the baseplate to assist with complete filling and to prevent spillage or overflow.
- Side forms should be positioned 25 to 50 mm horizontally away from the baseplate to allow air to escape freely and avoid trapping air beneath the plate.
- If a chamfered edge is required, install a fillet edge in the formwork or perform a diamond cut after curing. A square edge is also acceptable for epoxy grouts.
- On the exit side (opposite the grout entry point), extend the formwork 50 to 100 mm beyond the baseplate to allow insertion of straps or tools to assist grout movement if needed.

- HEADER BOX - On the grout entry side, extend the formwork 50 to 100 mm horizontally from the baseplate and slope it upward at approximately 45 degrees. This helps direct the grout smoothly beneath the plate, minimizing turbulence and reducing the risk of air entrapment.
- A backboard (or splash board) should also be installed on top of the baseplate, at the opposite edge of the sloped header box, to prevent grout spillage and to contain the grout head as placement progresses.

- For large baseplates—such as those used for turbines, generators, or other lengthy equipment—building full-length, high 'head' forms is often impractical.
- As an alternative, use low-profile forms that are high enough to contain the grout and extend at least 25 mm above the underside of the baseplate. To maintain the benefits of a sloped placement, a portable 'head box' can be used. This movable head box allows controlled grout placement along the length of the baseplate while reducing formwork costs.
- The portable head box, featuring a sloped pouring surface, should rest partly on the formwork, floor, or baseplate. This method often provides better control of grout flow than a continuous sloped form, helping ensure efficient placement with less material waste and improved flow management. The box with a sloped pouring surface should rest in part on the form, floor and/or base plate and this method serves just as well, and often better than a long-sloped form, as the thrust of the grout flow is better controlled.

- For large baseplates, another effective approach is to divide the area into smaller, manageable sections. This reduces the flow distance and volume, making placement easier and faster for the crew. Temporary sectioning forms can help improve placement control and productivity.
- Ensure all formwork is properly caulked to prevent grout leakage. Apply a suitable wax-based curing compound (e.g., MasterKure CC 100WB) or a plastic release coating to the form surfaces. This prevents grout from bonding to the forms, allowing for smooth grout finishes and protecting the forms for future reuse.
- Ensure all formwork is properly caulked to prevent grout leakage. Apply a suitable wax-based curing compound (e.g., MasterKure CC 100WB) or a plastic release coating to the form surfaces. This prevents grout from bonding to the forms, allowing for smooth grout finishes and protecting the forms for future reuse.

- Key areas to caulk include the interface between the form and the rough foundation surface, where leaks commonly occur. Suitable materials include joint sealants or epoxy mortars. Any large gaps or vertical joints in the formwork should also be sealed, and duct tape can be applied to the inside corners as an additional precaution.
- Before grouting, flood the formwork area with water to check for leaks. Address any leaks identified before proceeding with grout placement.

Plate & Equipment Preparation

- The underside of the baseplate or equipment to be grouted must be prepared by sandblasting to achieve a 'white metal' finish, ensuring the surface is free from coatings, wax, grease, or mill scale.
- In cases where new equipment is already coated with durable, high-performance systems such as polyurethane, these coatings do not need to be removed.
- While mechanical methods such as grinding or sanding can be used, they generally result in lower bond strength compared to sandblasting.
- To make post-application cleanup easier, protect any surrounding surfaces where grout splashes may occur by applying wax or covering them with suitable sheeting or tape.

APPLICATION- MASTERFLUX GROUTS

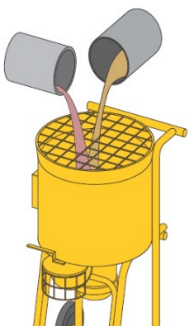
MasterFlux ER 618- Heavy Duty Epoxy Resin Thin Section Chocking Grout

- Fatigue resistance, high early strength, excellent chemical resistance, high bond strength.
- 50mm maximum pour thickness, narrow clearance down to 3mm.
- Suitable for application in machinery with high dynamic loading, backing grout for crushers and mills In corrosive environments.

MasterFlux ER 628- Heavy Duty Epoxy Resin Thin Section Multi-purpose Grout

- Fatigue resistance, high early strength, excellent chemical resistance, high bond strength.
- 50mm maximum pour thickness, narrow clearance down to 5mm.
- Suitable for application where water insensitivity is required, shallow underwater grouting, structural grouting applications.

Mixing:

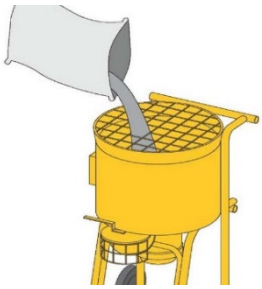


- MasterFlux ER 618 and ER 628 are supplied as two components and must be mixed using a low-speed mechanical mixer (less than 300 RPM) to minimise air entrapment.
- Pre-mix Part A to ensure it is fully homogeneous before adding Part B.
- Combine Part A and Part B, mixing until a uniform, streak-free consistency is achieved (approximately 3 to 5 minutes, depending on ambient temperature).
- Keep the mixer head submerged below the resin surface at all times to avoid drawing air into the mixture.
- A helix-style mixing paddle is recommended, as it lifts material from the bottom, helping to reduce air entrapment.
- Do not use high-energy mixers, such as “bird cage” mixers, as they are designed for cementitious materials and can introduce excessive air into epoxy products.
- Apply the mixed grout immediately after preparation to maximise working time.

MasterFlux ER 648- High Strength, High Flow Epoxy Grout

- High early strength, high tensile and flexural strength, high bond strength, good chemical resistance.
- Maximum thickness 150mm in single pour, Wide clearance range down to 15mm.
- Suitable for application as: Grouting of heavy-duty machinery with high dynamic load, where grouts are prone to chemical spillage, grouting of heavy-duty compressor in petrochemical industries.

Mixing- Small Kit



- For small volumes, use a variable-speed hand-held mixer (such as a Festo mixer) set to around 300 RPM.
- Pour the entire measured water into the mixing pail first.
- Gradually add the grout powder slowly over 30 seconds while mixing.
- Do not dump the powder all at once to avoid the formation of hard-to-break lumps.

- Mix for 1 to 2 minutes, keeping the paddle submerged to prevent air entrapment.
- Avoid excessive mixing speeds or extended mixing times, which can introduce unnecessary air without improving the mix.
- For larger areas requiring multiple bags: Pre-mix two to three bags in separate buckets, allowing them to stand briefly.
- Sequence the buckets by re-mixing each for about 20 seconds before applying. This method supports a semi-continuous pour, maintaining grout flow and reducing placement delays.

Mixing- Large kit

- Use a pan mixer (e.g., SOROTO) or a ribbon paddle-type mixer, which are ideal for large volumes.
- Add approximately 70–80% of the required water first. Slowly add the grout bags into the mixer while running, avoiding dumping the full bag contents as a solid mass.

- Mix for 3 minutes to break up any lumps. Add the remaining water gradually, and continue mixing until a homogeneous consistency is achieved (total mixing time 4–5 minutes).
- Perform a flow check to verify consistency before placement (refer to the "On-Site Quality Assurance" section for instructions).
- Ribbon paddle or mortar mixers equipped with horizontal blades provide efficient mixing for a wide range of grout consistencies.

Trials:

- Epoxy grout trials must be conducted using complete kits and with the same equipment intended for use on site, to ensure placement performance is representative of actual conditions.
- Trial materials and placement dimensions should match as closely as possible the final project specifications.
- When trialing small kits, simulate real-site conditions by mixing each kit individually if the placement requires multiple kits.
- Ensure the correct aggregate loading is applied based on the desired flow characteristics:

Normal		
	Single Mix	Normal Large Kit
MasterFlux ER 648 Part A	2.56	10.16
MasterFlux ER 648 Part B	1.0	4
MasterFlux ER 648 Part C	25*	100
*To achieve standard flow (full loading), add an additional 5 kg of aggregate to the small kit mix.		
Total	28.56	114.16
Resin to powder ratio	0.1424	0.1416
Hi Flow		
	Single Mix	Hi Flow Large Kit
MasterFlux ER 648 Part A	2.56	10.16
MasterFlux ER 648 Part B	1.0	4
MasterFlux ER 648 Part C	20	80
Total	23.56	94.16
Resin to powder ratio	0.178	0.177

Hot Weather Grouting

- Avoid mixing or placing grout when material temperatures exceed 30°C.
- If grout components are above 30°C at the time of mixing, take the following precautions:
  - Place sealed pails of liquid components in ice baths or
  - Cover the pails with water-soaked hessian to reduce temperature.
- For large projects, precondition the grout components in a temperature-controlled environment to maintain consistency and workability.
- Ensure the mixed grout temperature is below 30°C before placement.
- In hot environmental conditions (ambient temperatures above 30°C):
  - Cool both the grout and any added aggregate (if applicable) to below 25°C.
  - Provide shading over the work area for at least 24 hours before and 48 hours after grouting to minimise heat exposure and control curing conditions.

Cold Weather Grouting

- Do not apply grout when ambient temperatures are below 15°C, unless artificial heating is provided to assist with curing.
- Pre-warm grout components (Part A and Part B) to between 20°C and 30°C before mixing and placement.
- If heating is required:
  - Erect a temporary enclosure (using materials such as polyethylene sheeting or canvas) around the equipment and foundation.
  - Use suitable heating methods to raise the temperature of the substrate and surrounding area to support proper curing.

Cracking

- Hairline or surface cracking may occur around sharp corners of the baseplate or near anchor bolts. This is typically caused by lack of restraint in these areas and does not affect long-term performance.
- Horizontal edge cracks may also form just below the grout-to-concrete interface. These do not impact the bearing capacity or structural support of the baseplate.
- Such cracking is usually the result of thermal movement differences, particularly in outdoor or external applications. Cracks are generally limited to shoulder areas and do not compromise equipment support or alignment.

- If appearance is a concern, cosmetic repair using epoxy injection may be carried out.
- In cases where oil, chemical exposure, or moisture ingress is a concern, cracks can be sealed using a grout binder such as MasterStrength 2525 to prevent contamination of the concrete substrate.

Deep Pour Recommendations

- For pours up to 150 mm, use MasterFlux ER 648, which is designed for this application.
- For pours exceeding 150 mm and up to 450 mm, consult with Master Builders Solutions for a specific product recommendation suitable for your project requirements.
- For large volume pours (typically greater than 0.5 m^3), additional steel reinforcement may be used to minimise the risk of stress cracking:
  - Use 10–12 mm diameter steel bars spaced at 300–450 mm centres.
  - Place the top reinforcement tier approximately 50 mm below the baseplate.
  - Place the bottom reinforcement tier approximately 50 mm above the foundation surface.
- For deeper pours, additional reinforcement tiers can be added at equal spacing throughout the depth, including vertical supports as needed to maintain structural stability.

Anchor Bolt Grouting

Surface Preparation:

- Bolts must be free from oil, grease, and rust.
- Clean using a solvent wipe, such as MasterCoat THI 955, before placement.
- Preferred anchor types include deformed bars, fishtail bolts, or threaded rods with a nut or head for improved anchorage.
- Grit blasting or abrasive wheel cleaning may be required to remove mill scale or rust from the bolts.

Hole Preparation:

- Dry-drilled holes: Remove all dust and ensure surfaces are free of oil and grease.
- Wet-drilled holes: Rinse thoroughly with clean water to remove drilling slurry and ensure no free water remains before grouting.
- Formed holes: Mechanically chip or roughen the surface to remove laitance or form release agents.
- If polystyrene foam was used to form the holes, do not attempt to dissolve it with petrol or solvent thinners, as this will leave a sticky residue.

- Mechanically remove polystyrene using a wire brush or scraper attached to a vibrating hammer or similar tool.
- Hole Depth: 12 times bolt diameter.
- Hole Diameter: 1.5 times bolt diameter. Over 600mm deep a minimum of plus 50mm bolt diameter is recommended.
- Hole spacing at edges: Edge spacing and space between holes is bolt diameter x 8. Shear loads acting to the edge of concrete will need to be considered separately.

Bulking with Aggregates

Preloaded Aggregate Systems and Fill ratio

- MasterFlux ER 648 is supplied with pre-packaged aggregate as standard.
- The fill ratio is the weight of aggregate to that of the combined resin and hardener components. MasterFlow 648 is designed to be utilised at a variable fill ratio from 7.0:1 (Standard flow –100% of aggregate) to as low as 5.6:1 (Hi-flow – 80% of aggregate).
- MasterFlow 648 maintains a high bearing area when fill ratios are decreased. In addition, physical properties, including high temperature performance, are maintained.
- The chart below provides guidelines for the amount of aggregate that can be removed from a unit in order to optimise both flow and cost per cubic meter:

Temperature	Very Thin Pours or Very Long Distances	Standard Pours
>32°C	-	-
21-32°C	Up to 10%	-
10-21°C	10-20%	10%

Optional Bulking for MasterFlux ER 618

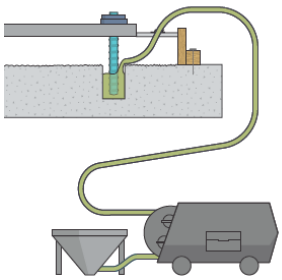
- MasterFlux ER 618 can be bulk-filled with aggregates or fillers supplied by Master Builders Solutions for large voids or cost optimisation:
- For low-reinforcement, large void applications: Add 15 kg of Filler F1 per 10 kg kit of MasterFlux ER 618.
- For higher flow applications: Add 10 kg of Filler F1 per 10 kg kit.
- As an alternative, 10 mm graded aggregate may be used at a ratio of 2 parts aggregate to 3 parts MasterFlux ER 618 by volume.

Note: This mixture becomes only marginally pumpable and may require manual placement or modified equipment settings.

APPLICATION- PLACING GROUTS

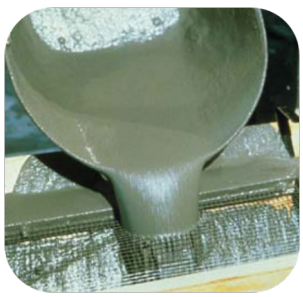
Pumps

- Pumping is recommended for placing MasterFlux ER 648 on large baseplates or for high-volume pours to improve placement efficiency.
- The preferred pump type is an air-powered diaphragm pump, which offers several advantages:
  - Easy to dismantle and clean
  - Resistant to solvents
  - Widely available and cost-effective
  - Durable and resistant to abrasion
- To ensure proper grout flow:
  - Use pump hoses with a minimum internal diameter of 50 mm.
  - Position the hose at the furthest point of the void to be grouted, and slowly withdraw it as the grout is pumped, ensuring the void fills progressively without trapping air.

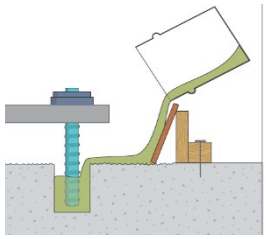


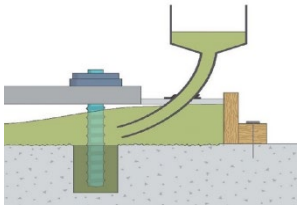
Methods of Placement

- Grout should be placed as soon as possible after mixing, ideally within 10 minutes of opening the packaging to maximise flow and performance.
- Grout may be placed by:
  - Pouring at a fluid or flowable consistency, or
  - Pumping, depending on project size and site requirements.
- The placement method should consider:
  - The size and shape of the equipment or baseplate,
  - Access restrictions,
  - Clearances and obstructions, and
  - Environmental conditions, such as temperature.
- Anchor bolt hole grouting should be completed before placing the main grout body. However, foundation grouting can commence immediately after bolt hole filling.

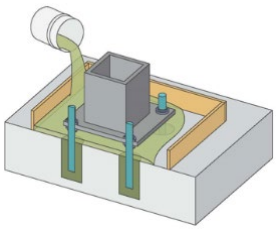


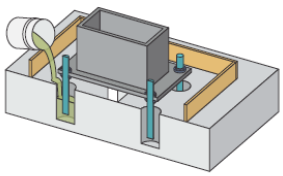
- Where the baseplate is already in position:
  - Use a sloping board to help direct grout into bolt holes.
  - Alternatively, use a tremie to deliver grout under congested areas or into hard-to-reach spaces beneath the baseplate.



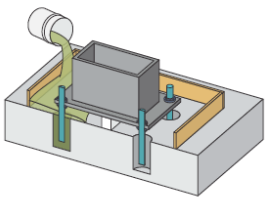


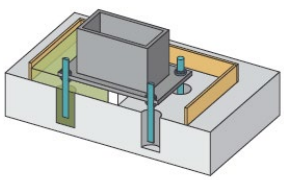
- Placement of grout should be across the shortest dimension of the equipment or base plate involved whenever possible.

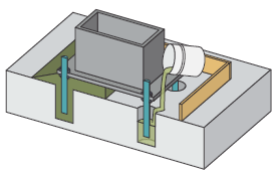


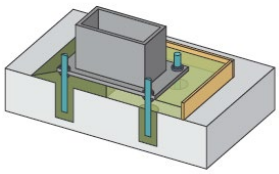


- With Large Baseplates or complex and congested areas to be grouted it may be necessary to divide the areas to be grouted into a number of sections. A size ratio of 1:1 or 1:2 has been found to work well (for example 2m wide and 2m deep or 2 m wide and 4 meters deep.

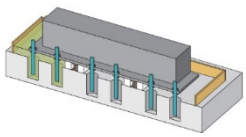


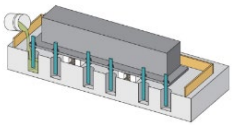


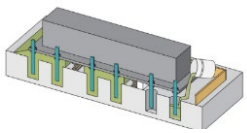


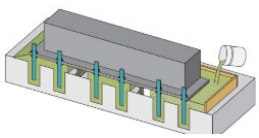


- Temporary formwork to divide the sections will be necessary and ensure that they will not be stuck to the grout.
- Grouting bolt holes for multi sectioned machine base with multiple sections of temporary formwork.
- Repeat the process for various sections

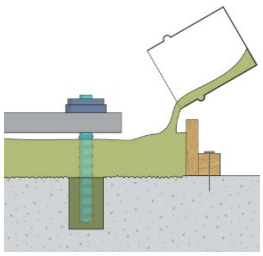






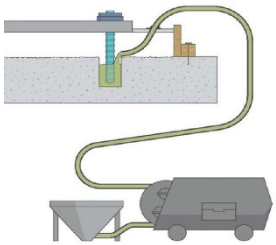


- Water-filled fabric hoses or removable timber formwork can be used to help guide and contain the grout.
    - Ensure that all free water is removed from the foundation surface and anchor bolt holes immediately prior to grouting.
- Flow distances up to 3 metres can typically be achieved using flow troughs at standard placement thicknesses.
- For fluid grout placement, maintain a minimum 50 mm vertical clearance between the baseplate and foundation formwork, especially for flat plates with minimal obstructions.
- For placements with horizontal distances up to 1.2 metres, the 50 mm clearance is sufficient.
- For rough or chipped foundations or placements extending beyond 1.2 metres, add an additional 25 mm of clearance for each additional 1.2 metres of horizontal travel.
- Recommended Placement Sequence:
    - Start at one end (typically at the slanted or head box) and continue until grout emerges above the bottom of the baseplate on the opposite side.
    - Slowly progress the pouring point along the formwork, ensuring continuous grout movement and proper air displacement.
    - Avoid placing grout at multiple random points along the same side, as this increases the risk of trapped air pockets or voids.
    - Do not place grout from opposite sides toward the center, as this can also trap voids.

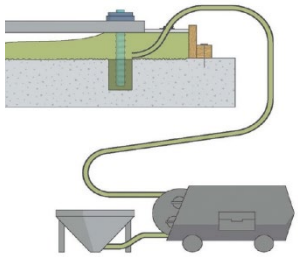


- Placement Aids:
    - Use 20–25 mm wide steel packing straps to help work the grout underneath obstacles and toward the exit side by gently sliding them back and forth.
    - Do not use chains, as they can trap air bubbles with each link.
    - Do not vibrate epoxy grouts, as this can cause segregation and reduce performance.
- Non-Standard or Complex Baseplates:
    - Plates with irregular undersides, stiffeners, or non-flat surfaces may require specialised placement methods.
    - For example, inverted 'cake pan' style plates may require grout to be poured from the top through pre-drilled holes, with small vent holes in the corners to allow air to escape.

- Extremely Large Plates or Long Flow Distances:
  - For plates requiring grout to travel more than 3–4 metres horizontally, consider: Top-side grout holes to reduce travel distance, or Pumping with suitable equipment (e.g., Putzmeister SP 11) using special formwork and entry pipes to fully fill the void.
  - Monitor grout movement and relocate the hose as needed to prevent pressure build-up or formwork damage.



- Large Volume Placements (1 m^3 or More):
  - Large pours should be placed quickly and continuously to prevent premature setting.
  - Pumping (e.g., Putzmeister SP 11) is recommended for efficient placement.



  - Because large mixes generate significant heat, use chilled water (0°C) to help maintain lower grout temperatures during placement. Refer to the Hot Weather Grouting section for additional temperature control recommendations.

OVERVIEW

Master Builders Solutions provides comprehensive construction solutions designed to enhance the performance, durability, and longevity of infrastructure projects. Our innovative range of products ensures that projects meet the highest standards of quality and reliability.
Along with innovative products, customers also receive on-site and technical support from the Master Builders Solutions team of experts. By diagnosing the underlying cause of deterioration, our specialists develop the most suitable repair strategy to prevent further damage and deliver lasting protection. Our civil infrastructure solutions are tailored to meet the specific needs of the construction industry in ANZ, delivering consistent results for a wide range of applications.

Other products application guide

- **MasterCrete: "Cementitious Concrete Repair"** Application Guide
- **MasterFlux: "Cementitious Grouts"** Application Guide
- **MasterStrength and MasterFill ER**: "**Epoxy Crack Repair Systems**" Application Guide
- **MasterFill PR: "Polyurethane injection resin**" Application Guide
- **MasterStrength LAM/FIB/BAR/ANC: "CFRP structural strengthening"** Application Guide
- **MasterJoint CHR**: "**Joint sealants**" Application Guide
- **MasterJoint 910: "Hydro-swelling waterbars for construction joints"** Application Guide
- **MasterJoint 930: "FPO tape for joint waterproofing"** Application Guide
- **MasterShield AKS**: "**Chemical resistant HDPE liner**" Application Guide
- **MasterShield CHR**: "**Chemical resistant Novalac coating**" Application Guide
- **MasterShield AC**: "**Anti-carbonation coatings**" Application Guide
- **MasterShield CI**: "**Impregnants and corrosion inhibitors**" Application Guide
- **MasterShield CP**: "**Galvanic cathodic protection systems**" Application Guide
- **MasterGeo**: "**Geotechnical Soil nails and anchors**" Application Guide

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