

TECHNICAL DATA SHEET

EPOXY GROUT

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Ramset Epoxy Grout is a tough epoxy resin based grout for use in pourable form or for mixing with graded sand filler to produce a trowellable consistency.

Epoxy Grout is 100% solids epoxy with negligible shrinkage.

RECOMMENDED USES

- ◆ Grouting heavy duty supports beneath crane and transporter rails
- ◆ Grouting under machinery baseplates
- ◆ Anchoring holding down bolts, deformed bars, ferrules and threaded rod into carbide drilled and diamond cored holes in concrete
- ◆ Bonding new to old concrete
- ◆ Grouting under column base plates
- ◆ Corrosion protection on steel reinforcement prior to application of concrete repair mortar

FEATURES AND BENEFITS

- ◆ High flow properties – good bonding and penetration
- ◆ Bonds to dry and damp concrete
- ◆ Pre-measured kits to avoid measuring errors
- ◆ High tensile and compressive strength
- ◆ 100% solids epoxy – solvent free and negligible shrinkage
- ◆ Cures at temperatures down to 5°C
- ◆ High mechanical strength
- ◆ Resistant to vibration and dynamic loads
- ◆ Add graded sand to change consistency

TABLE 1. Typical Properties of Unfilled Epoxy Grout

Typical properties after 7 days cure at 25°C and 50% relative humidity

Appearance	Part A: Grey thixotropic liquid Part B: Amber liquid Grey when mixed together
Viscosity	Flowable, pourable
Flammability	Non flammable
Solid content by weight	100%
Tensile strength	30 MPa approx.
Compressive strength	110MPa approx.
Flexural strength	25 MPa approx.
Tensile bond strength	10 MPa approx.
Modulus of elasticity	4.5 x 10 ³ MPa
Service temperature	-10°C to + 65°C
Heat distortion temp	80°C approx.
Hardness	> 80 Shore D
Pot life	45 – 50 mins @ 25°C
Tack free time	1.5 – 2.5 hours @ 25°C
Mix ratio	5:1 (part A:B) by volume
Min. Application temp.	5°C
Max. Application temp.	35°C
Density	1.53 kg/Litre
Water absorption*	<0.2% (10 days at 25°C)
Full cure	7 days at 25°C

*Tested to ASTM D570

Table 2. Typical Properties of Epoxy Grout Mixed with Ramset Fillers FG

Consistency	Volume of Epoxy Grout (Litres)	Weight of Fillers FG (Kg)	Yield of Mixture (Litres)	Pot Life @ 20°C (Minutes)	Compressive Strength @ 7 days (MPa)	Tensile Strength @ 7 days (MPa)	Flexural Strength @ 7 days (MPa)
Fluid	1	0.6	1.2	40-45	110	17	32
Pourable	1	1.5	1.6	40-50	100	15	29
Stiff Paste	1	2.0	1.8	55-65	95	14	28
Trowellable	1	2.3	1.9	60-70	90	12	26
Dry Pack	1	2.6	2.0	65-80	85	11	26

PRECAUTIONS

◆ Exotherm:

- Epoxy Grout will generate heat when mixed. Mixing Epoxy Grout in volumes > 10 litres will result in rapid increase in temperature and short pot life
- Exceeding the maximum pour thickness will result in rapid increase in temperature, which may lead to shrinking and cracking
- When added to Epoxy Grout, Fillers FG will act as a heat sink and moderate the temperature rise (exotherm)
- To prevent cracking due to exotherm, pour to a maximum thickness of 50 mm
- For thicknesses greater than 50 mm, pour in successive layers of maximum 50 mm each
- Wait until the first layer has started to cool before pouring the next layer

◆ Minimum Thickness: 1.5 mm

◆ Mixing and Placing Temperature:

- If Epoxy Grout temperature is at or below 5°C, place sealed containers in warm water up to 25°C, for at least 4 hours before use.
- Alternatively store containers in a temperature controlled environment for 12 hours before use.
- If Epoxy Grout temperature is above 35°C, place sealed containers in cool water (about 20°C) for at least 4 hours before use
- Alternatively store containers in a temperature controlled (eg. air-conditioned) environment for 12 hours before use

◆ Dilution: Do not dilute Epoxy Grout with solvents, as it will not perform as specified

◆ Mix Ratio:

- 5 parts Part A to 1 parts Part B by volume. Incorrect mix ratio will affect the strength of Epoxy Grout
- Epoxy Grout is supplied as pre-measured kits. Where practical mix total contents of each part of 2 L and 4 L kits together to avoid measuring errors

GENERAL PREPARATION

- ◆ Concrete must be at least 28 days old and have a minimum compressive strength of 20 MPa.
- ◆ Ensure concrete is free from dust, oil, grease, laitance, form release agents, surface coatings, adhesives, loose materials or any agent, substance, material or contaminant that may interfere with the bond or may later affect the grout.
- ◆ Grit blast or scabble concrete to expose clean surface.

- ◆ Remove ponded water. Concrete may be damp but not wet.
- ◆ Cut steel reinforcement and formwork to size and shape and assemble before mixing commences.

MIXING

1. Read precautions section above and Material Safety Data Sheet before commencing.
2. Epoxy Grout must be thoroughly mixed. Incomplete mixing will result in hard and soft spots and affect the grout's strength.
3. Stir the hardener and base components separately before mixing together, to disperse any settlement.
4. If Fillers are required, add correct weight to Part A and mix with *Ramset* high shear mixing paddle LSMP. (See Table 2 above).
5. Pour the entire contents of the Part B container into the Part A container.
6. If kit quantity is greater than 10 L or if only part of a smaller kit is to be used, accurately measure the volume of Part A and Part B into a clean dry container at a ratio of 5:1 by volume.
7. Mix the two components together using a suitable slow-speed mixer and high-shear mixing paddle (No Fillers: *Ramset* – SSMP, With Fillers *Ramset* - LSMP), for 2 minutes, until a fully uniform colour is obtained.
8. Scrape the sides of the tin and continue mixing for a further 2 minutes.

POT LIFE: Pot life depends upon ambient temperature and volume of epoxy. As a guide a 4 L kit will have 45 to 50 minutes pot life at 25°C. For pot life with fillers see table 2.

APPLICATION

Apply Epoxy Grout as soon as the mixing process has been completed.

Bonding New to Old Concrete:

Apply unfilled Epoxy Grout to prepared surfaces with a brush or roller.

Pour new concrete while Epoxy Grout is tacky (See Tack Free Time in Table 1 above).

Coverage: 4.5m² / Litre.

Grouting:

- ◆ Position and level baseplate



- ◆ Construct formwork around base plate with 25 mm clearance
- ◆ Coat formwork with a thin film of grease or other release agent to prevent permanent bond
- ◆ Form a pouring head with minimum 150 mm above base plate level
- ◆ Form 50 mm off-side shutter opposite pouring head to allow air and grout to escape
- ◆ Read mixing instructions 1 to 8 above
- 9. Pour Epoxy Grout into the pouring hopper
- 10. Keep pouring until Epoxy Grout has risen in the off-side shutter
- 11. Allow Epoxy Grout to cure for 24 hours before stripping form work

Starter Bars, Holding Down Bolts, Threaded Studs, Ferrules

Read the "Precautions" section of these instructions prior to use.

Setting and technical data provided applies to:

- ◆ Holes drilled with Dynadrill® Concrete Drilling Machines or Rotary Hammers using carbide drill bits with tolerances in accordance with DIN8035, and where holes have been cleaned using a brush and air pump.
 - ◆ Diamond core drilled holes that have been cleaned using a brush and air pump.
- a) Drill hole using correctly sized drill bit to the specified depth. (See Tables 3 & 4. for recommended dimensions).
 - b) Clean hole with stiff nylon or wire bristles. Using a combination Push/Pull and twisting (rotation) motion, ensure the sides of the hole are scrubbed at least 3 times for the full depth of the hole.
 - c) Remove debris, dust etc. from the hole using a hole cleaning blower with at least 4 swift pumps, alternatively use a strong blast of compressed air
 - d) Reinforcing bars, internally threaded sockets, threaded rods or studs to be used should be cleaned and free from oil, grease, flaking rust or debris. Threaded rods or studs should be chisel ended to prevent them unthreading from the cured grout.
 - e) Ensure that holes are dry. If holes have been left for a prolonged period since drilling, re-cleaning in accordance with 'b) & c)' above is recommended.
 - f) Read mixing instructions (1 to 8) above.

Holding Down Bolts, Threaded Rod and Studs:

9. Suspend holding down bolts, threaded rod and studs in drilled holes such that they are vertical and concentric
10. Pour Epoxy Grout into concrete holes until full
11. Do not touch or load anchor for 24 hours.

12. Once Epoxy Grout has cured, tighten to recommended torque. Consult engineer's drawings.

Ferrules

9. Pour Epoxy Grout into drilled holes until half full
10. Ferrules must be fitted with caps to prevent Epoxy Grout entering sockets and contaminating threads
11. Puddle ferrules into Epoxy Grout until they reach the bottom of the holes
12. Clean away excess Epoxy Grout with a cloth
13. Do not touch or load ferrules for 24 hours
14. Remove caps, insert and tighten bolts to torque recommended on engineer's drawings

CURE TIME: Epoxy Grout will achieve about 80% of its final cure strength in 24 hours and will achieve full strength in 7 days.

Remove formwork and apply full torque to bolts after 24 hours.

CLEAN UP

Clean up uncured material and equipment immediately after use using *Ramset Solvent (SVGP)* or Xylene. Do not use solvents on skin.

Remove cured Epoxy Grout by mechanical means.

STORAGE AND SHELF LIFE

Store between 10°C and 30°C. Shelf life is 1 year in original unopened container.

HEALTH AND SAFETY

- ◆ Avoid contact with the skin, eyes and avoid breathing vapour.
- ◆ Wear protective gloves and glasses when drilling, mixing or using.
- ◆ If poisoning occurs, contact a doctor or Poisons Information Centre.
- ◆ If swallowed, do not induce vomiting. Give a glass of water.
- ◆ If skin contact occurs, remove contaminated clothing and wash skin thoroughly for a minimum of 15 minutes.
- ◆ If in eyes, hold eyes open, flood with water for at least 15 minutes and seek medical advice
- ◆ For more detailed information refer to the Material Safety Data Sheet available from *Ramset* by calling 1300 780 063 or from the web at www.ramset.com.au

PACK SIZES AND ORDER NUMBERS

Pack Size	Order Number
1 Litre	EPGRL1
4 Litres	EPGRL4
16 Litres	EPGRL16



Installing Threaded Rod and Reinforcing Bar into Solid Concrete with *Ramset* Epoxy Grout

Table 3. Recommended Epoxy Grout Hold Down Bolt, Threaded Rod and Reinforcing Bar Installation Guide

Parameter	Minimum	Maximum
Drilled Hole Diameter Threaded Rod, d_h	Rod / Bar diameter (d_b) + 2 mm	2 x d_b
Drilled Hole Diameter Reinforcing Bar, d_h	d_b + 5 mm	2 x d_b
Effective Hole Depth, h	8 x d_b	
Critical Edge Distance, e_c	3 x h	
Critical Anchor Spacing, a_c	6 x h	
Depth of Concrete Substrate, b_m	1.25 x h	

More information on Anchoring Technology can be found in the *Ramset* “Specifier’s Resource Book”. Contact *Ramset* the concrete anchoring experts for a copy or contact your local *Ramset* Engineer.

Installing *Ramset* Ferrules into Solid Concrete with *Ramset* Epoxy Grout

To create a post-installed internally threaded fixing, *Ramset* have developed a method of installing ferrules into solid concrete with Epoxy Grout instead of the traditional cast-in method.

Table 4. Installation Details for *Ramset* Ferrules in solid Concrete

Ferrule Size, d_b x L (mm)	Ramset Part Number	Drilled Hole Diameter, d_h (mm)	Hole Depth, h (mm)	Edge Distance, e_c , (mm)	Anchor Spacing, a_c (mm)	Substrate Thickness, b_m (mm)
M10 x 44	TCM10RSS*	22	50	120	60	50
M12 x 54	TCM12RSS*	25	60	150	80	65
M16 x 75	TCM16RSS*	32	80	200	100	85
M20 x 80	TCM20RSS*	35	85	240	120	100
M12 x 95	FE12095(GH) ⁺	28	100	135	270	115
M16 x 95	FE16095(GH) ⁺	35	100	135	270	115
M20 x 95	FE20095(GH) ⁺	40	100	135	270	115

* SS denotes Stainless Steel

⁺ Available in zinc galvanised or hot dipped galvanised (GH) carbon steel

For more information on Ferrules consult *Ramset* Product Guide, Specifier’s Resource Book or visit the website.

Table 5. Working Load Limits in Tension of Ferrules installed in Solid Concrete with *Ramset* Epoxy Grout

Ferrule Size, d_b x L (mm)	Tension, N_a (kN)*		
	Concrete Compressive Strength, $f'c$ (MPa)		
	20 MPa	32 MPa	40 MPa
M10 x 44	4.0	5.0	5.6
M12 x 54	5.7	7.3	8.1
M16 x 75	9.7	12.3	13.7
M20 x 80	11.0	13.9	15.5
M12 x 95	15.9	20.1	22.5
M16 x 95	18.4	23.2	26.0
M20 x 95	20.6	26.0	29.1

* Working Load Limit (WLL) = Lower Characteristic Ultimate Concrete Tensile Load Capacity (N_{uc}) / 3

- The Working Load Limits in table 5 are limited by concrete cone capacity. Check tensile capacity of bolts against table 5 to determine if fixing load capacity is limited by steel
- For shear loads away from concrete edge use steel shear capacity.
- For shear loads acting towards a concrete edge contact *Ramset* for further advice



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