

# ChemSet™ CRACK INJECTION SYSTEM

Ramset Chemset Crack Injection System is a two part low viscosity high strength epoxy for injection of cracks in all concrete elements. It offers excellent adhesion and high compressive strength and restores the structure to its original monolithic condition.



**Ramset™**  
[www.ramset.co.nz](http://www.ramset.co.nz)



**ChemSet<sup>TM</sup>**  
**Crack Injection System**

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## Fast dispensing 2 Part Epoxy Crack Injection 900ml System

### Description

Ramset Chemset Crack Injection System is a two part low viscosity high strength epoxy for injection of cracks in all concrete elements. It offers excellent adhesion and high compressive strength and restores the structure to its original monolithic condition.

### Areas of application

- Pre Cast Panels
- Concrete Walls
- Concrete Floors
- Pre Cast Elements
- Stopping leaks in concrete
- Concrete structures

### Features

- Low viscosity
- Capillary Action
- Suitable for cracks down to 0.2mm
- 900ml re-sealable cartridge.
- Deep penetration
- Bonds to damp surfaces
- Solvent free
- High strength
- Repairs cracked concrete to better than new

### General Properties

Shelf Life	2 years
Appearance of Hardener	Thin amber liquid
Appearance of Compound	Amber liquid
Mixing Proportions by Weight or Volume	1 Hardener to 2 Compound
Solids Content	100%
Tensile Strength	45MPa approx
Compressive strength	100MPa approx
Flexural Strength	50MPa approx
Tensile Bond Strength	15MPa approx
Work Time	30 minutes at 25°C
Cure Time	7 Days at 25°C
Initial Mixed Viscosity	0.3 Pa.s
Density	1.08 g/cm <sup>3</sup>
Water Permeability	4 x 10 <sup>-17</sup> m/s
Resistance to Chloride ion Penetration	Good

### Cleaning

Clean tools and equipment before hardening commences by washing with Ramset Solvent Cleaner (FMSVM500). Do not use for cleaning hands or mixing with product.

### Limitations

Ramset Chemset Crack Injection Epoxy should not be applied at temperatures below 10°C.

### Storage and Shelf Life

Store in dry conditions between 10°C and 30°C, away from sources of heat and naked flames. Protect from frost. When stored in original sealed containers the minimum shelf life is 2 years.

### Safety precautions

Avoid contact with skin and avoid breathing vapour. Wear gloves and goggles when mixing and using. Keep away from children. Provide adequate ventilation if applied in confined spaces. If poisoning occurs call a Doctor or Poisons Information Centre. If swallowed DO NOT induce vomiting, give plenty of water or milk. If skin contact occurs remove any contaminated clothing and wash affected areas thoroughly with soap and water.

**TDG Code:** Hardener - UN 1760 Compound - Not Classified.

### Note

The figures quoted for work time, cure time and performance are not definitive. They are dependent on job site conditions and will vary accordingly. In all cases we endeavour to provide typical figures for use as a guide.

### Contents

Bis-phenol A Epichlorohydrin > 60%  
Alkyl glycidyl ether (C12 to C14) 10 – 20 %  
Hardener component  
Isophorone diamine 30-60%  
Aromatic alcohol 30-60%

### Instructions for Users

#### A. The system comprises:

- |                |  |
|----------------|--|
| 1) RAMNZCIE900 | 900ML CRACK REPAIR CARTRIDGE                             |
| 2) 62532HOSE   | STATIC MIXER FOR 900ML CARTRIDGE                         |
| 3) 427SAE      | FLANGE/NIPPLE ADAPTOR (TO CONNECT HOSE TO FLANGE/NIPPLE) |
| 4) 419SAE      | FLANGE/NIPPLE  |
| 5) 7X1004      | ADAPTOR REMOVING TOOL                                    |
| 6) 600XPPM1    | BI-MIXER APPLICATOR TOOL<br>300:600ML                    |

#### B. To operate the system:

Pressure Injected Structural Repair:

Vacuum or brush the crack clean along its entire length and if possible, on both sides of the structure. Ensure foreign matter is removed from the crack.

“V” out the crack along its whole length if a surface coating is present i.e. paint or sealant.

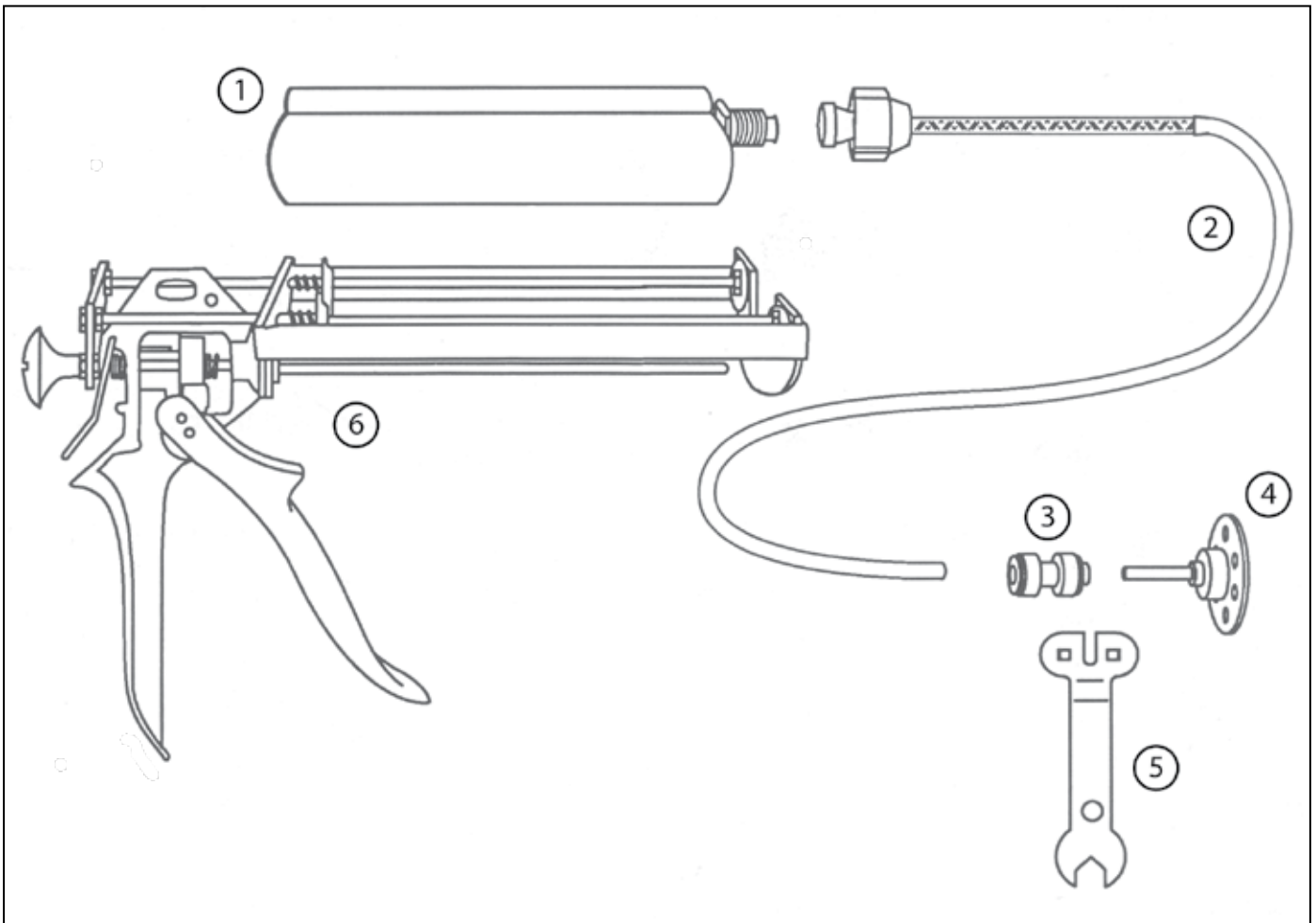
1. Affix the Flanges/Nipples (419SAE) to the substrate using Chemset Mortar Adhesive; ensure adhesive extends through the holes, as well as 3-5mm around the circumference, of the base of the Flange/Nipples, the distance between the Flanges/Nipples is dependent on crack width and substrate thickness.
2. Seal the top of the crack between the Flanges/Nipples (419SAE) to the substrate using Chemset Mortar Adhesive.

# ChemSet™ | CRACK REPAIR EPOXY

## Fast dispensing 2 Part Epoxy Crack Injection 900ml System

3. Ensure all Flanges/Nipples (419SAE) are in the open position. This will allow injection material to flow from the Flange/Nipple below. To open the Flange/Nipple, push the stem of the Flange/Nipple down, towards the base.
4. Remove "D" plugs in the end of the cartridges. Connect the Static Mixer with Hose (62532HOSE), to the Twin Cartridges, filled with Injection Epoxy, using the Retaining Nut.
5. Hold the gun vertically upright pointed away from people and dispense the first 20 to 30 mls of material, until a homogenous colour and mix is obtained. This ensures the material is mixed through the Static Mixer. This wasted material should be disposed of thoughtfully and in a safe environmental manner.
6. One end of the Adaptor (427SAE) is connected to the hose, whilst the other end of the Adaptor, is pushed onto the stem of the Flange/Nipple (419SAE). This opens the Flange/Nipple, so that injection material will pass through the Flange/Nipple into the crack.
7. The crack is injected with injection material. Once injection material appears from the Flange/Nipple above, either the Hose OR Adaptor (427SAE), is pulled back, away from the base of the Flange/Nipple (419SAE). This locks the Flange/Nipple and stems the flow of injection material.
8. Use the Adaptor Removing Tool to disconnect the Adaptor (427SAE) from the stem of the Flange/Nipple (427SAE). Wedge the Tool between the base of the Flange/Nipple (419SAE) and the Adaptor (427SAE). Simply pull back with the Tool (7X1004) on to the Adaptor, and away from the base of the Flange/Nipple. This will release the Adaptor from the Flange/Nipple.
9. Repeat the injection procedure outlined at (4) to (7) above.
10. After full cure grind off the Flanges/Nipples and Mortar Adhesive. Make good the substrate

Item Code	Extended Description
(1) RAMNZIE900	900 ML CRACK REPAIR KIT
(2) 62532HOSE	STATIC MIXER FOR 900 ML KIT
(3) 427SAE	CRACK INJECTION FLANGE ADAPTOR
(4) 419SAE	CRACK PLASTIC FLANGE PACK
(5) 7x1004	FLANGE REMOVING TOOL
(6) 600XPPM1	BI-MIXER MANUAL - 300:600 ML



## Crack Repair 2 Part Epoxy EPIREZ® 123 - 300ml Drizzle Pack

### Description

Ramset Chemset Crack Repair Epoxy is a two part low viscosity high strength epoxy for repair of cracks in all concrete elements. It offers excellent adhesion and high compressive strength and restores the structure to its original monolithic condition.

### Areas of application

- Concrete Floors
- Residential
- Commercial
- Structural Repairs to Damaged Concrete
- Bonding to old concrete
- Horizontal Applications Only

### Features

- Low viscosity
- Capillary Action
- Suitable for cracks down to 0.2mm
- Convenient 300ml Pack (two part)
- Deep penetration
- Bonds to damp surfaces
- Solvent free
- High strength

### General Properties

Shelf Life	2 years
Appearance of Hardener	Thin amber liquid
Appearance of Compound	Amber liquid
Mixing Proportions by Weight or Volume	1 Hardener to 2 Compound
Solids Content	100%
Tensile Strength	45MPa approx
Compressive strength	100MPa approx
Flexural Strength	50MPa approx
Tensile Bond Strength	15MPa approx
Work Time	30 minutes at 25°C
Cure Time	7 Days at 25°C
Initial Mixed Viscosity	0.3 Pa.s
Density	1.08 g/cm <sup>3</sup>
Water Permeability	4 x 10 <sup>-17</sup> m/s
Resistance to Chloride ion Penetration	Good

### Instructions for Users

#### A. The System Comprises

- 1) CRACK REPAIR EPOXY COMPOUND (PART A)
- 2) CRACK REPAIR EPOXY HARDENER (PART B)

Vacuum or brush the crack clean along its entire length, ensure foreign matter is removed from the crack.

“V” out the crack along its whole length, this creates a dam in the substrate and allows the epoxy to be built up to the surface, resulting in a uniform repair.

1. Add Crack Repair Epoxy Hardener (PART B) into the Crack Repair Epoxy Compound (PART A) bottle and mix until Exotherm (Heat Generation), be sure not to over mix as this will result in short pot life.
2. Starting at one end “drizzle” the epoxy into the crack, working your way along the length of the crack until the crack fills. Multiple applications maybe required to fill the crack. It is possible for the epoxy to settle, this may occur sometime after initial application. Reapply if required until crack is filled.
3. NOTE: If the crack penetrates the substrate completely then Ramset General Purpose Mortar Binder 133 (EPIREZ1331L) should be used.
4. After full cure, make good the substrate.

### Cleaning

Clean tools and equipment before hardening commences by washing with Ramset Solvent Cleaner (FMSVM500). Do not use for cleaning hands or mixing with product.

### Limitations

Ramset Chemset Crack Repair Epoxy should not be applied at temperatures below 10°C.

### Storage and Shelf Life

Store in dry conditions between 10°C and 30°C, away from sources of heat and naked flames. Protect from frost. When stored in original sealed containers the minimum shelf life is 2 years.

### Safety precautions

Avoid contact with skin and avoid breathing vapour. Wear gloves and goggles when mixing and using. Keep away from children. Provide adequate ventilation if applied in confined spaces. If poisoning occurs call a Doctor or Poisons Information Centre. If swallowed DO NOT induce vomiting, give plenty of water or milk. If skin contact occurs remove any contaminated clothing and wash affected areas thoroughly with soap and water.

**TDG Code:** Hardener - UN 1760 Compound - Not Classified.

### Note

The figures quoted for work time, cure time and performance are not definitive. They are dependent on job site conditions and will vary accordingly. In all cases we endeavour to provide typical figures for use as a guide.

### Health & Safety Information

The product is hazardous. A Material Safety Data Sheet is available from Ramset New Zealand.

#### Item Code

EPIREZ123300ML

#### Extended Description

EPIREZ 300 ML DRIZZLE PACK

## Crack Repair 2 Part Epoxy EPIREZ® 123 - 25 Litre Kit

### Description

Ramset Chemset Crack Repair Epoxy is a two part low viscosity high strength epoxy for injection of cracks in all concrete elements. It offers excellent adhesion and high compressive strength and restores the structure to its original monolithic condition.

Packaged in 25 Litre Kits it is for use in High Pressure Epoxy Pumps

### Areas of application

- Pre Cast Panels
- Concrete Walls
- Concrete Floors
- Pre Cast Elements
- Columns
- Bridge Decks
- Tunnels
- Stopping leaks in concrete
- Concrete structures

### Features

- Low viscosity
- Capillary Action
- Convenient 25 Litre Drum
- Deep penetration
- Bonds to damp surfaces
- Solvent free
- High strength

### General Properties

Shelf Life	2 years
Appearance of Hardener	Thin amber liquid
Appearance of Compound	Amber liquid
Mixing Proportions by Weight or Volume	1 Hardener to 2 Compound
Solids Content	100%
Tensile Strength	45MPa approx
Compressive strength	100MPa approx
Flexural Strength	50MPa approx
Tensile Bond Strength	15MPa approx
Work Time	30 minutes at 25°C
Cure Time	7 Days at 25°C
Initial Mixed Viscosity	0.3 Pa.s
Density	1.08 g/cm <sup>3</sup>
Water Permeability	4 x 10 <sup>-17</sup> m/s
Resistance to Chloride ion Penetration	Good

### Mixing

Depending on the type of Epoxy Pump that is used, distribute Ramset Chemset Crack Repair Epoxy into Part A and Part B hoppers.

#### If mixing is required:

Add 1 Hardener to 2 Compound and mix thoroughly using a low speed mixer (400rpm). Take care to avoid air entrapment in the mix. Only mix enough material that can be used within the recommended work time.

### Cleaning

Clean tools and equipment before hardening commences by washing with Ramset Solvent Cleaner (FMSVM500). Do not use for cleaning hands or mixing with product.

### Limitations

Ramset Chemset Crack Repair Epoxy should not be applied at temperatures below 10°C.

### Storage and Shelf Life

Store in dry conditions between 10°C and 30°C, away from sources of heat and naked flames. Protect from frost. When stored in original sealed containers the minimum shelf life is 2 years.

### Safety precautions

Avoid contact with skin and avoid breathing vapour. Wear gloves and goggles when mixing and using. Keep away from children. Provide adequate ventilation if applied in confined spaces. If poisoning occurs call a Doctor or Poisons Information Centre. If swallowed DO NOT induce vomiting, give plenty of water or milk. If skin contact occurs remove any contaminated clothing and wash affected areas thoroughly with soap and water.

**TDG Code:** Hardener - UN 1760 Compound - Not Classified.

### Note

The figures quoted for work time, cure time and performance are not definitive. They are dependent on job site conditions and will vary accordingly. In all cases we endeavour to provide typical figures for use as a guide.

### Health & Safety Information

The product is hazardous. A Material Safety Data Sheet is available from Ramset New Zealand.

<b>Item Code</b>	<b>Extended Description</b>
EPIREZ12325L	EPIREZ 25 LITRE KIT

## General Purpose Epoxy Mortar Binder EPIREZ® 133 - 1 Litre Kit

### Description

Ramset Chemset Crack Repair Epoxy Mortar is a solventless epoxy mortar or concrete binder designed for applications demanding high structural integrity. When mixed with graded sand fillers it produces various consistencies. Ramset Chemset Epoxy Mortar is 100% solids epoxy with negligible shrinkage. Ramset Chemset Epoxy Mortar has been independently tested and meets the requirements of AS/NZS 4020 - 2002 for use in contact with potable water.

### Areas of application

- Structural bonding of new to old concrete
- Repairing cracks in concrete
- Structural repair of spalled concrete and masonry
- Grouting of load bearing bolts and supports in concrete
- Splash zone repairs to concrete and timber piled structures

### Features

- Multi-purpose use
- High mechanical strength
- Low viscosity
- High chemical resistance
- Excellent adhesion to wet or dry concrete
- Non-shrink
- Low temperature cure
- Aggregate extendible

### General Properties (Binder Only)

Shelf Life	2 years
Appearance of Hardener	Colourless Liquid
Appearance of Compound	Colourless Liquid
Mixing Proportions by Volume	1 Hardener to 3 Compound
Solids Content	100%
Work Time	30 Minutes at 25°C
Tack Free Time, as a Coating	6 Hours at 25°C
Hardening Time	24 Hours at 25°C
Compressive Strength, Ultimate	95 MPa
Compressive Modulus	3.4 Gpa
Tensile Strength, Ultimate	55 MPa
Water Permeability	2 x 10 <sup>-17</sup> m/s

### Estimating Data

1L Ramset Chemset Epoxy Mortar = 1 m<sup>2</sup> at 1 mm thick.

### Application Directions

#### Surface preparation

Remove all loose, crumbly and drummy areas to obtain a sound surface. Captive blast clean or acid etch to expose firmly held aggregate.

Ensure that surfaces are free of dust, oil and grease. Dampness can be tolerated.

Surface preparation guidelines cannot cover all site or field contingencies and it is always recommended that an on-the-spot adhesion test be performed as part of the Standard Quality Assurance audit for the project.

### Mixing

Measure sufficient Hardener and Compound to be used in 30 minutes. Mix thoroughly using a low speed power mixer. Ensure that all the material on the sides and on the stirrer are incorporated. Take care to avoid air entrapment in the mix.

If extending with Aggregate follow guide in table below. Aggregate is kiln dried (with a moisture content below 0.2%) and supplied in a sealed drum. Care should be taken to keep aggregate dry after opening.

### Structural Bonding New to Old Concrete

Ramset Chemset Epoxy Mortar has been used on many major projects to structurally bond new to old concrete. These applications result in strengths significantly greater than the concrete mixes involved, and in tensile, shear or flexural tests separation at the bond line will not occur.

Apply mixed Ramset Chemset Epoxy Mortar using a broom or squeegee at a rate of 3-6m<sup>2</sup>/litre over the cleaned surface. Porous, absorbent surfaces may need more. Immediately pour concrete whilst film is still wet. Allow concrete to cure normally. If delay occurs beyond 60 minutes at 25°C, recoat with Ramset Chemset Epoxy Mortar.

New to Old Bond Strength : 105% University of Arizona Test.

### Structural Repair of Spalled Concrete and Masonry

Ramset Chemset Epoxy Mortar can be used to repair damaged concrete and masonry structures. Correctly applied, the completed repair will demonstrate higher strengths than the original structure.

Prime cleaned surfaces with by brush, roller or airless spray. Prepare a trowellable mortar by mixing 1 volume mixed Ramset Chemset Epoxy Mortar and 3 volumes with Mortar Aggregate. Place this mortar over the freshly primed areas and trowel to a smooth finish. Minimise air content. This mortar exhibits excellent adhesion. Remove splash and spatter from adjacent surfaces before hardening occurs.

Tensile Strength :	>10 MPa
Concrete Bond Strength :	2.7 MPa (Concrete Failure)
Compressive Strength :	70 MPa
Flexural Strength :	>20 MPa
Water Permeability :	1.2 x 10 <sup>-16</sup> m/s
Resistance to Chloride Ion Penetration:	Excellent

### Grouting of Load Bearing Bolts and Supports in Concrete

Ramset Chemset Epoxy Mortar grouts offer significant advantages over cement-based products. Rapid hardening, chemical resistance, good performance under dynamic loading and ability of grouted elements to be set close together and close to edges are just some advantages. Bolts and bars are best grouted with a grout mix 1 volume of mixed Ramset Chemset Epoxy Mortar and 1½ - 2 volumes of Aggregate. Use hole diameters of 1½ times insert diameter. Smaller inserts (10mm diameter and less) can be grouted with mixed Ramset Chemset Epoxy Mortar unextended.

Inserts should be free of oil, grease and dust and preferably grit blasted to "bright metal" condition. Holes should be clean of dust and debris. Wet holes should be free of standing water.

Pour mixed Ramset Chemset Epoxy Mortar or mixed Ramset Chemset Epoxy Mortar and Aggregate into the holes and insert bolts or bars.

## General Purpose Epoxy Mortar Binder EPIREZ® 133 - 1 Litre Kit

### Typical Properties of Ramset Chemset Epoxy Mortar mixed with fillers

Consistency	Volume of epoxy patch (litres)	Weight of fillers (kg)	Yield of mixture (litres)	Pot life at 20°C (mins)	Compressive strength at 7 days (MPa)	Tensile strength at 7 days (MPa)	Flexural strength at 7 days (MPa)
Very fluid	1	1.7	2.0	35-45	80	16	28
Fluid	1	3.4	3.0	40-50	75	14	26
Pourable	1	5.1	4.0	55-65	70	13	26
Stiff Paste	1	6.8	5.0	55-65	70	11	25
Trowellable	1	8.5	6.0	55-65	70	11	24
Dry Trowellable	1	10.2	7.0	65-70	60	10	21

### Typical Pull Out Strengths (40 MPa Concrete)

14mm deformed bar (embedded 150mm) > 50 kN Bar Fails

14mm threaded bolt (embedded 110mm) > 50 kN Bar Fails

25mm deformed bar (embedded 225mm) >150 kN Concrete Fails

25mm threaded bolt (embedded 175mm) >150 kN Concrete Fails

Safe Working Load Factors are available from Ramset New Zealand. Bearing plates should be surrounded with formwork protected with a suitable Release Agent and a flowable mortar consisting of Ramset Chemset Epoxy Mortar and Aggregate poured into the void.

### 10 Underwater and Splash Zone Repairs to Concrete, Timber and Steel Structures

Ramset Chemset Epoxy Mortar has excellent underwater adhesion to most structural members and it easily displaces water in formed up voids.

Surfaces should be grit blasted to expose firmly held aggregate and then primed with Ramset Chemset Epoxy Mortar. An underwater grout mix should be prepared (1 volume mixed Ramset Chemset Epoxy Mortar and 1½ volumes Aggregate) and poured to displace water. Underwater repairs may show higher strengths due to better compaction if the grout mix is poured through a 50 - 75mm diameter PVC conduit or hose.

### Compressive Strength Underwater

(Placed and cured under sea water at 20°C)

Compressive Strength : 50 MPa

### Tensile Bond Strength Underwater

(Placed and cured under sea water at 20°C)

Steel to Concrete : 2.5 MPa Concrete Fails

Concrete to Concrete : 2.5 MPa Concrete Fails

Steel to Timber : 3.5 MPa Timber Fails

### Pile Restoration Tests

(Placed and cured under sea water at 20°C and based on

Compressive Strengths of the pile)

### Concrete Piles

Eroded Pile : 71% of new pile

General Purpose Epoxy Mortar Binder (133) repaired pile : 111% of new pile

### Timber Piles

Eroded Pile : 26% of new pile

Ramset Chemset Epoxy Mortar repaired pile : 104% of new pile

### Engineering Performance

#### Skid Proofing of Concrete and Timber

Ramset Chemset Epoxy Mortar may be used to skid proof concrete and timber surfaces by using the "Spread and Sprinkle" technique. Apply mixed Ramset Chemset Epoxy Mortar to the prepared surfaces at a rate of 6m<sup>2</sup>/ litre using a long nap roller. Broadcast an excess Mortar Aggregate and allow to harden overnight. Sweep off excess and apply a second coat of Ramset Chemset Epoxy Mortar to seal the surface.

#### Cleaning

Tools and equipment may be cleaned before hardening commences by washing with Ramset Solvent Cleaner (FMSVM500). Do not use for cleaning hands or mixing with product.

#### Storage and Shelf Life

Store in dry conditions between 10°C and 30°C, away from sources of heat and naked flames. Protect from frost. When stored in original sealed containers, the minimum shelf life is two years.

#### Packaging

Ramset Chemset Epoxy Mortar is available in 1 litre pack. Each pack contains Hardener and Compound in the correct proportions for use.

#### Safety Precautions

Avoid contact with skin and avoid breathing vapour. Wear gloves and goggles when mixing and using. Keep away from children. Provide adequate ventilation if applied in confined spaces. If poisoning occurs call a Doctor or Poisons Information Centre. If swallowed DO NOT induce vomiting. Give plenty of water or milk. If skin contact occurs remove any contaminated clothing and wash affected area thoroughly with soap and water.

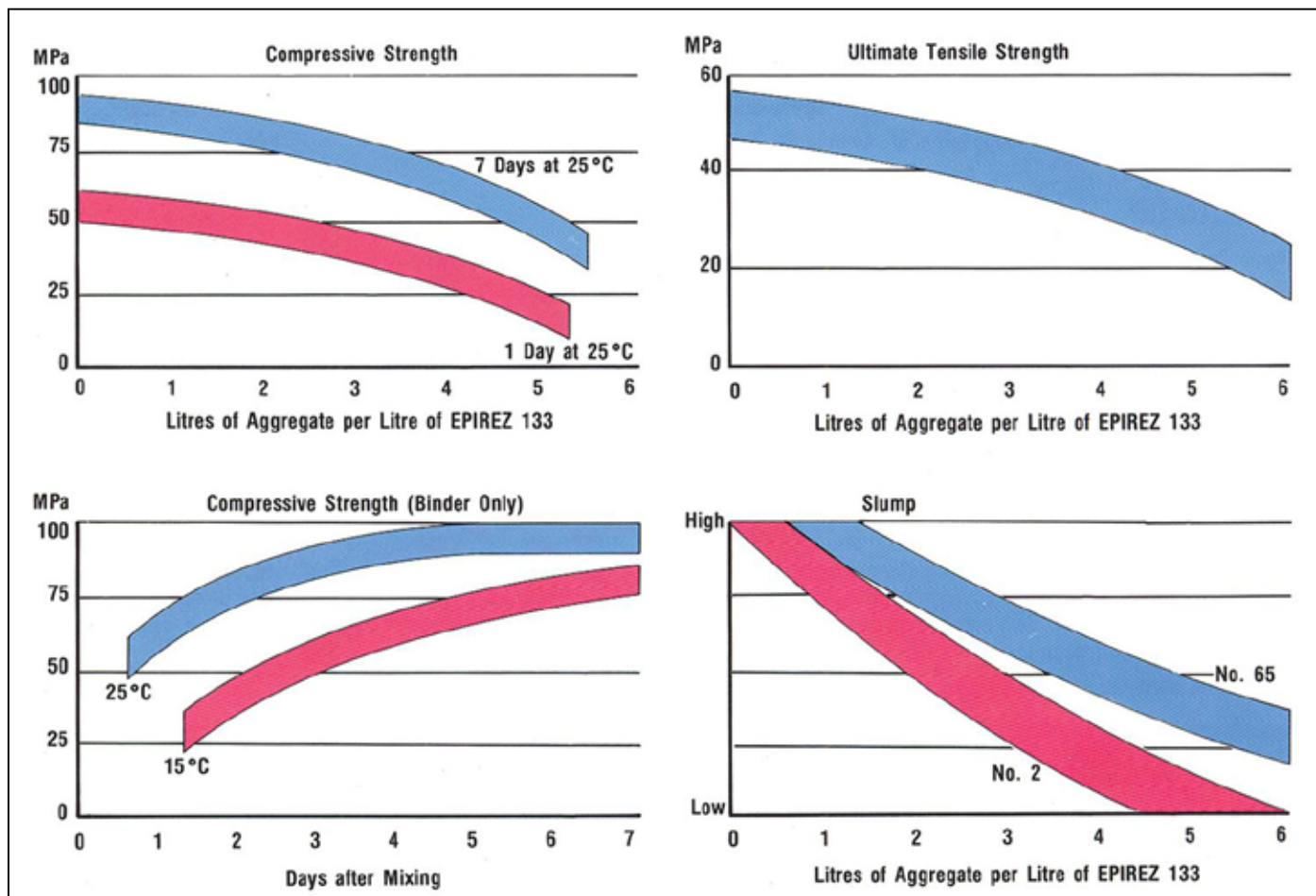
#### Note

The figures quoted for work time, tack free time and hardening time are not definitive. They are dependent on job site conditions and will vary accordingly. In all cases we endeavour to provide typical figures for use as a guide.

#### Health & Safety Information

The product is hazardous. A Material Safety Data Sheet is available from Ramset New Zealand upon request.

### Engineering Performance



# ChemSet™ | ADHESIVE

## Adhesive 101 - 380ml Pack



### Function

Ramset Chemset Adhesive is a chemical system based on polyester mortar. The two parts are dispensed and mixed in one action through a static mixing nozzle, which allows accurate mixing with no mess.

### Features and Benefits

#### Fast Installation

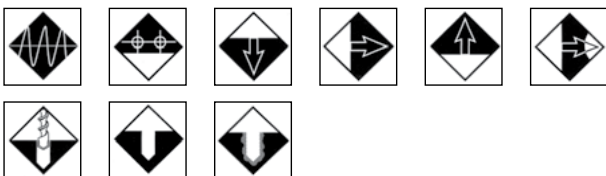
- Load in 1 hour (at 20°C)

#### Versatile

- Suitable for adhering to a wide variety of substrates
- Can be used on damp surfaces

### Principal Application

Adapted to be used with the Ramset Chemset Crack Injection System for adhering Flanges/Nipples and for pasting over cracks in the crack injection process.



### Installation

1. Attach static mixer to 380ml cartridge and insert into an applicator (CUA).
2. Dispense the adhesive through the static mixer until a light grey colour is achieved.
3. Apply to Flanges/Nipples and in between and a paste for sealing of cracks.
4. Allow Ramset Chemset Adhesive to set and continue with crack injection process.

### Installation Temperature Limits

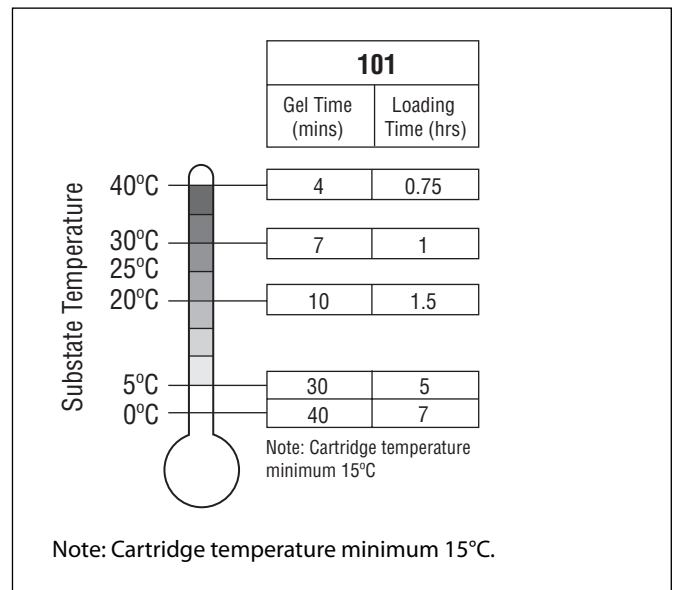
Substrate: 0°C to 43°C

Mortar: 15°C to 30°C

Pressure should not be applied to Flanges/Nipples until the chemical has sufficiently cured.

Service temperature limits -10°C to 80°C.

### Setting Times



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