Fosroc® Renderoc® LA55 Plus

constructive solutions

High strength, shrinkage controlled, polymer modified, fluid micro-concrete for structural repairs of all types conforming to the requirements of EN 1504-3 Class R4

Uses

Renderoc LA55 Plus is ideal for the reinstatement of large, structural sections of concrete as well as for many smaller locations where difficulties of access make hand or trowel-applied mortars impractical. The highly fluid nature of Renderoc LA55 Plus obviates the need for compaction and vibration even where access to the repair zone is restricted or where reinforcement is congested.

It is suitable for use where excellent chloride and carbon dioxide resistance is required or for repairs to concrete affected by alkali-silica reaction (ASR). Renderoc LA55 Plus is alkaline in nature and will protect embedded steel reinforcement.

Advantages

- Made in Australia
- RCS (Respirable Crystalline Silica) Hazard Free*
- Can be applied in sections up to 500mm thick
- Achieves 75MPa @ 56 days
- Maximum compatibility with concrete compressive strength >45MPa
- Unique dual expansion system offers an extremely high level of control of plastic and long-term drying shrinkage
- Low alkali content minimises risk of alkali-silica reaction
- Excellent bond to concrete substrates without independent primer
- Extremely low permeability provides excellent protection against carbon dioxide and chlorides
- Enhanced durability - Meets the requirements of durability to RMS B80 concrete specification
- Sustainable product with low carbon foot print and reduced emissions of greenhouse gases
- Exceptional flow allows pumping or pouring into restricted locations
- Self-compacting nature eliminates honeycombing and displaces air without vibration
- Pre-bagged to overcome site-batched variations - only the site addition of clean water is required
- Contains no chloride admixtures
- Complies to AS 4020:2018 - suitable for use in drinking water

Standards Compliance

Renderoc LA55 Plus complies to AS 4020:2018 at an exposure level of 15,000mm² per litre; AWQC Report 361681.

Copies of the report are available on the Fosroc website.

Description

Renderoc LA55 Plus is supplied as a ready to use blend of dry powders which require only the site addition of clean water to produce a free-flowing, shrinkage compensated, micro-concrete suitable for large volume repairs at a nominal thickness in excess of 50mm.

The unique formulation of Renderoc LA55 Plus is based on supplementary cementitious materials (SCMs) making it environmental friendly.

The formulation inclides graded aggregates and additives, which minimises water demand, promotes high fluidity, ensures fast strength gain and long-term durability. A unique system controls plastic and long-term drying shrinkage. The aggregate grading is designed to aid uniform mixing and to eliminate segregation under pumping pressures. It's low alkali content minimises the risk of alkali–silica reaction. The hardened product exhibits excellent thermal compatibility and very low water permeability.

Maximum aggregate size is 5mm.

*Renderoc LA55 Plus is classified not hazardous for RCS in accordance with Australian Inventory of Industrial Chemicals; contains <0.1% RCS.

Design criteria

Renderoc LA55 Plus is designed for large volume repairs typically in excess of 50mm deep. The product can be applied in sections generally between 50mm - 500mm thick. Greater thicknesses may be achievable dependent on the configuration of the repair, location and volume of exposed reinforcing steel. Long narrow repairs should be avoided where possible and pours arranged to achieve a length:minimum thickness ratio, of not more than 20:1. Under conditions of high temperature and rapid drying or when very small sections are being constructed this ratio should be reduced. Longer lengths may be achievable, again dependent on configuration, steel position and density, ambient temperature, humidity and other environmental considerations. Contact Fosroc for further information.

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Properties

The following results were obtained at a water:powder ratio of 0.115 and temperature of 20°C unless otherwise stated.

Test Method	Standard	EN 1504 R4 Requirement	Test Result
Compressive Strength	EN 12190:1999 AS 1478.2 - 2005	≥ 45 MPa	≥ 75 MPa 5 MPa @ 1 day 30 MPa @ 3 days 42 MPa @ 7 days 60 MPa @ 28 days 75 MPa @ 56 days
Bond strength by pull off	EN 1542:1999	≥ 2.0 MPa	3.5 MPa without primer (pre-soak)
Chloride ion Content	EN 1015-17:2000	≤ 0.05%	0.04%
Capillary Absorption	EN 1307:2002	≤ 0.5 Kg/(m² x $h^{0.5}$)	0.1 Kg/(m² x $h^{0.5}$)
Carbonation Resistance	EN 13295:2005	d ≤ref concrete	Conform
Coefficient of thermal expansion	EN 1770:1990	Declared Value	16.3 x 10^{-6} /°C
Shrinkage and Expansion	EN 12617-4:2002	> 2.0 MPa	Shrinkage: 3.5 MPa Expansion: 3.5 MPa
Elastic Modulus	EN 13412:2008	> 20 GPa	42.4 GPa
Chloride Diffusion	Nordtest NT Build 443	-	0.60 x 10^{-12} m²/sec
Flexural Strength	AS 1012.11 - 2000	-	10.1 MPa @ 28 days
Tensile Strength	AS 1012.10 - 2000	-	5.5 MPa @ 28 days
Setting Time	AS 1012.18 - 1996	-	Initial Set: 9 hours, Final Set: 12 hours
Fresh Wet Density		-	2315 Kg/m³
Drying Shrinkage (25 x 25 x 285) prisms @ 27°C, 55% RH)	AS 1478.2 - 2005	-	< 200 microstrains @ 7 days < 300 microstrains @ 28 days
Alkali reactive particles	RTA Rapid Mortar Bar Test RTA T363	-	<0.1% (Non-Reactive)
Flow Characteristics	AS1478.2 - 2005	-	750mm (flow trough)
Flow Retention @ 23°C		-	Remain fluid for up to 1 hour
Electrical Resistivity	AASHTO TP 95:2014 (50 mm Probe Spacing)	-	117,000 ohm.cm @ 28 days 194,000 ohm.cm @ 56 days

Clarification of property values: The typical properties given above are derived from laboratory testing. Results derived from field applied samples may vary.Test Results to ASTM Specification C1107: 2001

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Application Instructions

Preparation

The unrestrained surface area of the repair must be kept to a minimum. The formwork should be rigid and tight to prevent loss of material and have properly sealed faces to ensure that no water is absorbed from the repair material. The formwork should include drainage outlets for presoaking and, if beneath a soffit, provision for air-venting. Provision must also be made for suitable access points to pour or pump the mixed micro-concrete into place.

Saw cut or cut back the extremities of the repair locations to a depth of at least 25mm to avoid feather-edging and to provide a square edge. Break out the complete repair area to a minimum depth of 50mm up to the sawn edge.

Clean the surface and remove any dust, unsound or contaminated material, plaster, oil, paint, grease, corrosion deposits or algae. Where breaking out is not required, roughen the surface and remove any laitance by light scabbling or grit-blasting.

Oil and grease deposits should be removed by steam cleaning, detergent scrubbing or the use of a proprietary degreaser. The effectiveness of decontamination should then be assessed by a pull-off test.

Expose fully any corroded steel in the repair area and remove all loose scale and corrosion deposits paying particular attention to the back of exposed steel bars. Abrasive blasting or high pressure water blasting is recommended for this process.

Where corrosion has occurred due to the presence of chlorides, the steel should be high-pressure washed with clean water immediately after grit-blasting to remove corrosion products from pits and imperfections within its surface.

Reinforcing steel priming

Apply one full coat of Nitoprime Zincrich and allow to dry before continuing. If any doubt exists about having achieved an unbroken coating, a second application should be made and, again, allowed to dry before continuing.

Pre-soaking - Substrate priming

Pre-soaking the formed repair area with clean water helps to ensure good adhesion of the Renderoc LA55 Plus at the interface of the concrete and improves the flow of the grout during the installation. The area should be filled with clean water for a **minimum 2 hours** before the grouting takes place.

Immediately before application takes place, any free water should be removed by draining or vacuum.

Mixing

Care should be taken to ensure that Renderoc LA55 Plus is thoroughly mixed. A forced-action mixer is essential. Mix for 3 to 5 minutes at a slow speed (400/500 rpm) in a suitably sized drum using appropriate equipment such as a 120/140mm helical mixing paddle fitted to a heavy-duty 1600W mixer.

Free-fall mixers must not be used. Mixing of part bags is not recommended.

It is essential that machine mixing capacity and labour availability is adequate to enable the placing operation to be carried out continuously. Measure 2.2 - 2.4 litres of drinking quality water and pour three-quarters into the mixer. With the machine in operation, add one full 20kg bag of Renderoc LA55 Plus and mix for one minute before adding the rest of the water. Mix for a further 2 - 3 minutes until a smooth even consistency is obtained. Note that powder must always be added to water. The quantities mixed may be scaled up as required.

When the drill and paddle mixing method is used, the complete 2.2 - 2.4 litres of water should be placed in the mixing drum. With the paddle rotating, add one full 20kg bag of Renderoc LA55 Plus and mix for 2 - 3 minutes until a smooth even consistency is obtained.

It is recommended that the mixed product be passed through a suitable coarse metal screen prior to placing or pumping to highlight any unmixed material.

Mixing warning

As with other 'one pack' repair mortars, Renderoc LA55 Plus may exhibit satisfactory handling characteristics even though inadequately mixed. This will result in a significantly lower level of performance or possible failure. It is therefore essential that mixing instructions are strictly adhered to with particular emphasis on the quantity of water used and the time of the mixing operation.

Placing

The mixed material should be placed within 30 minutes of mixing in order to gain the full benefit of fluidity and of the expansion process. If placing by pump, standard concrete pumping practice should be followed. The pump and pipeline must be 'primed' with a rich cement slurry or mortar, discharging the 'grout' as waste. Pumping should be commenced immediately after 'priming' in this way.

Renderoc LA55 Plus when used for reinstatement of horizontal areas, must be suitably restrained by formwork.

Low temperature working

In cold conditions down to 5°C, the use of warm mixing water (up to 30°C) is advisable to accelerate strength development. Normal precautions for winter working with cementitious materials should then be adopted.

The material should not be applied when the substrate and/or air temperature is 5°C and falling. At 5°C static temperature or at 5°C and rising, the application may proceed.

High temperature working

At ambient temperatures above 35°C, the material should be stored in the shade and iced water considered for mixing.

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Curing

Correct curing is essential to ensure optimum performance of the product. The formwork should be left in place until the compressive strength of the Renderoc LA55 Plus is 10 MPa or as otherwise specified by the Supervising Officer.

Renderoc LA55 Plus a cement-based concrete reinstatement material. It is recommend that the formwork be left in place for as long as practically possible to provide the best curing conditions.

In common with all cementitious materials, Renderoc LA55 Plus must be cured immediately after the formwork is stripped in accordance with good concrete practice. Immediately after striking the formwork, all exposed faces of the repair should be thoroughly soaked with clean water and then sprayed with a liquid curing membrane such as Concure A99. Any delay in starting the curing process after the formwork is stripped will adversely affect the performance of the product. In fast drying conditions, supplementary curing with polythene sheeting taped down at the edges must be used. In cold conditions, the finished repair must be protected from freezing.

Overcoating with protective decorative finishes

Renderoc LA55 Plus is extremely durable and will provide excellent protection to the embedded steel reinforcement within the repaired locations. The surrounding parts of the structure will generally benefit from the application of a protective barrier/ decorative coating to limit the advance of chlorides and carbon dioxide, thus bringing them up to the same protective standard as the repair itself.

Parchem recommend the use of the Dekguard range of protective, anti-carbonation coatings. These products provide a decorative and uniform appearance as well as protecting areas of the structure which might otherwise be at risk from the environment. All traces of form-release oils and curing membranes must be removed prior to the application of Dekguard products. This is best achieved by light grit or sand-blasting. Typically, overcoating can proceed after 14 days cure of the Renderoc LA55 Plus however this time may be reduced depending on the size of the repair and the ambient conditions. Refer to Fosroc for further advice.

Cleaning

Renderoc LA55 Plus and Concure A99 should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically.

Equipment used with Nitoprime Zincrich should be cleaned with Fosroc Solvent 10.

Limitations

Renderoc LA55 Plus should not be used when the temperature is below 5°C and falling. Do not mix part bags under any circumstances. The product should not be used to reinstate horizontal areas where the surface would remain unrestrained during cure. It should not be exposed to moving water during application. If any doubts arise concerning temperature, application or substrate conditions, contact Fosroc.

Supply

Renderoc LA55 Plus 20kg:	FC300744-20KG
Nitoprime Zincrich 1 litre:	FC322100-1L
Concure A99 20 litre:	FC600909-20L
Fosroc Solvent 10 4 litre:	FC600800-4L

Coverage and yield

Renderoc LA55 Plus:	Approx 9.7 litres / 20 kg bag
Nitoprime Zincrich:	7 m²/litre
Concure A99:	5 m²/litre

Note: the coverage figures for liquid products are theoretical - due to wastage factors and the variety and nature of possible substrates, practical coverage figures will be reduced.

Storage

Renderoc LA55 Plus has a shelf life of 24 months from date of manufacture if kept in the original, unopened bags. Do not use if there are lumps in the product.

If stored at high temperatures and/or high humidity conditions the shelf life may be reduced.

Important notice

A Safety Data Sheet (SDS) is available from the Fosroc website. Read the SDS and TDS carefully prior to use as application or performance data may change from time to time. In emergency, contact any Poisons Information Centre (phone 13 11 26 within Australia) or a doctor for advice.

Product disclaimer

This Technical Data Sheet (TDS) summarises our best knowledge of the product, including how to use and apply the product based on the information available at the time. You should read this TDS carefully and consider the information in the context of how the product will be used, including in conjunction with any other product and the type of surfaces to, and the manner in which, the product will be applied. Our responsibility for products sold is subject to our standard terms and conditions of sale. Parchem does not accept any liability either directly or indirectly for any losses suffered in connection with the use or application of the product whether or not in accordance with any advice, specification, recommendation or information given by it.

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Parchem Construction Supplies Pty Ltd
1956 Dandenong Rd Clayton VIC 3168
Ph: 1800 812 864
ABN 80 069 961 968
www.fosroc.com.au
Distributed in New Zealand by: Concrete Plus Ltd
150 Hutt Park Road Gracefield Ph: 0800 657 156
www.fosroc.co.nz