

# Metric R4 Flow

Fibre-reinforced pourable mortar with compensated shrinkage for reinforced concrete structural repair.

Metric R4 Flow is a class R4 mortar with high mechanical resistance for the repairing and consolidating of reinforced concrete structures by formwork pouring or on horizontal surfaces.



## Rating 4

1. Pourable, class R4
2. Thicknesses from 10 to 100 mm in a single coat
3. For structural layered repairs of reinforced concrete
4. Extremely fluid
5. Applicable with a machine

- ✓ Regional Mineral  $\geq 60\%$
- × Recycled Regional Mineral  $\geq 30\%$
- ✓ CO<sub>2</sub> Emission  $\leq 250$  g/kg
- ✓ VOC Low Emission
- ✓ Recyclable

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## Areas of application

### → Use

Repair and structural consolidation of weakened reinforced concrete and prestressed reinforced concrete elements of any nature and size:

- by the formwork casting of concrete for vertical structures and at the soffit of horizontal elements;

- by pouring onto the top surface of horizontal elements or by bonded section underpinning in general.

Repairs of concrete floors.

Filling of rigid joints.

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## Instructions for use

### → Preparation of substrates

Before applying Metric R4 Flow it is necessary to:

- thoroughly remove all weakened concrete until a solid, resistant substrate is obtained; roughen it by mechanical scarification or hydro-demolition to a depth of  $\geq 5$  mm, equivalent to level 9 of the Test kit for preparation of reinforced concrete and masonry substrates;
- remove the rust from the reinforcing bars, which must be cleaned by brushing (manual or mechanical) or sandblasting;
- clean the treated substrate using compressed air or a high pressure washer;
- saturate with water until the substrate is saturated yet with no excess water on the surface. Alternatively on horizontal concrete surfaces, apply Geolite Base on a dry substrate in order to ensure regular absorption and promote the natural crystallisation of the ge-mortar.

Check that the resistance class of the supporting concrete is suitable.

In case of thick patched layers and on large surface areas, provide a reinforcing welded mesh anchored to the substrate.

### → Preparation

Prepare Metric R4 Flow by mixing the powder using the amount of water indicated on the packaging (we advise using the whole bag).

The mixture can be prepared in:

- a mixer, mixing until a smooth, lump-free mortar is obtained;
- a suitable mixing pump;
- a mortar mixer or drill-type mixing device with a low-rev agitator.

- For repair and/or reinforcement, apply the mortar by pouring or pumping it on the extrados of horizontal surfaces or in sealed and formworks treated with parting compound that assists air escape, using the correct application techniques. Application thicknesses shall not be less than 10 mm. For applications, both horizontal and vertical, involving a thickness of more than 60-100 mm (according to the type of work to be carried out and the size of the intervention), in order to contain hydration heat, mix up a fine grain concrete, adding Ghiaia 3.6 gravel in a ratio of 25-40% by weight of the powder (25-40 kg of Ghiaia 3.6 for every 100 kg of Metric R4 Flow), so that the grain size curve is optimised according to the application thickness.

- Do not subject the casting to vibration. To facilitate the passage of mortar in difficult situations use wooden elements or steel reinforcing rods.

- Mechanical application: it is recommended to use a piston plastering machine or an endless screw plastering machine (such as Turbosol, Putzmeister, PFT, Bunker, Imer) or a three-phase continuous pump mixer (such as PFT G4) equipped with the following accessories: mixer, stator/rotor D 6-3 (flow rate 22 l/min),  $\varnothing$  25 mm flexible hose, 10-15 m long and spray gun.

- Metric R4 Flow must be integrated to the structure to be restored by embedding the existing reinforcing rods, after freeing them from the concrete, or by inserting additional reinforcement in the form of rods or electro-welded mesh.

Allow to cure during the first 24 hrs.

### → Application

- Treat the reinforcing bars with Metric Rebar before applying Metric R4 Flow.

### → Cleaning

Residual traces of Metric R4 Flow can be removed from tools and machines using water before the product hardens.

## Certificates and marks



When properly emptied, the packaging is recyclable as paper (up to 80 per cent) according to the ATICELCA® 501 method.



\* Émission dans l'air intérieur Information sur le niveau d'émission de substances volatiles dans l'air intérieur, présentant un risque de toxicité par inhalation, sur une échelle de classe allant de A+ (très faibles émissions) à C (fortes émissions).

## Abstract

Supply and laying of a fibre-reinforced pourable mortar with compensated shrinkage, such as Metric R4 Flow by Kerakoll, for localised or generalised centimetre-thick structural repair of reinforced concrete in damaged or deteriorated sections reconstruction of concrete floors, by applying by hand or machine casting into formworks or on horizontal surfaces, after adequate preparation and wetting of the substrates until fully saturated. GreenBuilding Rating 4, CE-marked and compliant with the performance requirements of Standard EN 1504-3, Class R4, type CC and PCC, for volumetric reconstruction; according to Principles as defined by Standard EN 1504-9. For applications, both horizontal and vertical, involving a thickness of more than 60-100 mm (according to the type of work to be carried out and the size of the intervention), mix up a fine grain concrete adding gravel, such as Ghiaia 3.6 by Kerakoll, in a ratio of 25-40% by weight of the mortar.

### Technical Data compliant with Kerakoll Quality Standard

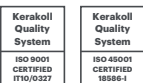
Appearance	Powder	
Apparent volumetric mass	≈ 1380 kg/m <sup>3</sup>	UEAtc
Aggregate mineral content	silicate - carbonate	
Grading	0 – 2.5 mm	EN 12192-1
Shelf life	≈ 12 months from production in the original sealed packaging, protect from humidity	
Pack	25 kg bags	
Mixing water	≈ 3.8 l / 1 x 25 kg bag	
Flow of the mixture	280 – 300 mm with no shaker table vibration	EN 13395-1
Density of the mixture	≈ 2270 kg/m <sup>3</sup>	
pH of the mixture	≥ 12,5	
Pot life	≥ 1 hr	
Temperature range for application	from +5 °C to +35 °C	
Minimum thickness	10 mm	
Maximum thickness per layer	60 – 100 mm (according to the type of work and the size of the operation)	
	For thicker layers, mix with Ghiaia 3.6 gravel	
Coverage	≈ 20 kg/m <sup>2</sup> per cm of thickness	

Values taken at +21 °C, 60% R.H. and no ventilation. Data may vary depending on specific conditions at the building site.

<b>Performance</b>			
<b>VOC Indoor Air Quality (IAQ) - Volatile organic compound emissions</b>			
Conformity	EC 1 plus GEV-Emicode	GEV certified 17141/11.01.02	
<b>HIGH-TECH</b>			
<b>Performance characteristic</b>	<b>Test Method</b>	<b>Requirements of EN 1504-3 class R4</b>	<b>Metric R4 Flow performance in CC and PCC conditions</b>
Compressive strength	EN 12190	≥ 45 MPa (28 days)	> 30 MPa (24 hrs)
			> 60 MPa (7 days)
			> 75 MPa (28 days)
Flexural tensile strength	EN 196-1	None	> 6 MPa (24 hrs)
			> 8 MPa (7 days)
			> 10 MPa (28 days)
Adhesive bond	EN 1542	≥ 2 MPa (28 days)	> 2 MPa (28 days)
Resistance to carbonation	EN 13295	dk ≤ reference concrete [MC (0.45)]	value exceeded
Modulus of elasticity under compression	EN 13412	≥ 20 GPa (28 days)	27 GPa in CC 24 GPa in PCC
Thermal compatibility with freeze/thaw cycles with de-icing salts	EN 13687-1	bond strength after 50 cycles ≥ 2 MPa	> 2 MPa
Capillary absorption	EN 13057	≤ 0.5 kg·m <sup>-2</sup> ·h <sup>-0.5</sup>	< 0.5 kg·m <sup>-2</sup> ·h <sup>-0.5</sup>
Chloride ion content (determined on the product in powder form)	EN 1015-17	≤ 0.05%	< 0.05%
Reaction to fire	EN 13501-1	Euroclass	A1
	<b>Test Method</b>	<b>Requirements of standard</b>	<b>Metric R4 Flow</b>
Embedded bar adhesive tension	RILEM-CEB-FIPRC6-78	None	> 25 MPa
Crack Bridging properties	O-Ring test	None	no cracks
Bleeding	UNI 8998	None	none
Resistance to severe chemical attacks (group 3: unused heating oil, diesel oil and oils for engine and gear)	EN 13529	analysis of damage and bond strength ≥ 2 MPa	no deterioration and bond strengths > 2 Mpa
Water-resistance	EN 12390-8	None	< 4 mm
<b>Aggregate performance characteristic</b>	<b>Test Method</b>	<b>Requirements of UNI 8520-22</b>	<b>Aggregate performance Metric R4 Flow</b>
Alkali-aggregates reaction	UNI 11504	reactivity class	NR (non-reactive)

## Warning

- Product for professional use
- abide by any standards and national regulations
- use at temperatures between +5 °C and +35 °C
- do not add binders or additives to the mixture
- do not apply to dirty, loose and flaking surfaces
- do not apply on gypsum, metal or wood
- following application, protect from direct sunlight and wind
- allow the product to cure during the first 24 hours
- if necessary, ask for the safety data sheet
- for any other issues, contact the Kerakoll Worldwide Global Service +39 0536 811 516 - [globalservice@kerakoll.com](mailto:globalservice@kerakoll.com)



The Rating classifications refer to the GreenBuilding Rating Manual 2012. This information was last updated in October 2023 (ref. GBR Data Report - 10.23); please note that additions and/or amendments to this information may be made over time by KERAKOLL Spa; for the latest version, see [www.kerakoll.com](http://www.kerakoll.com). KERAKOLL SpA shall therefore be liable for the validity, accuracy and updating of information provided only when taken directly from its institutional website. The technical data sheet given here is based on our technical and practical knowledge. As it is not possible for us to directly check the conditions in your building site and the execution of the work, this information represents general indications that do not bind Kerakoll in any way. Therefore, it is advisable to perform a preliminary test to verify the suitability of the product for your purposes.