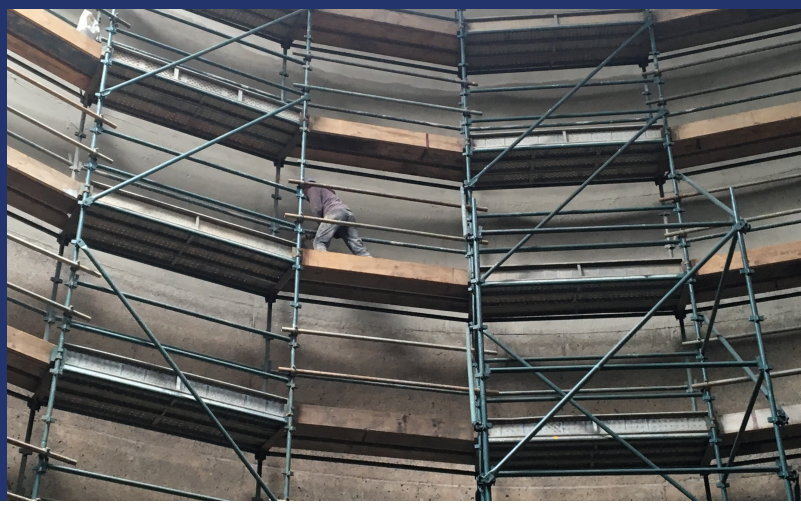
VELOSIT® RM 205

Structural Concrete Repair Mortar R4



Application fields

VELOSIT RM 205 is a cementitious repair mortar for concrete restoration acc. to EN 1504-9. It is used to fill large voids or build up larger cross-sections up to 100 mm (4”). Typical application fields besides others are as follows:

- Repair of large surface defects on concrete
- Overlays and repairs on concrete structures like dams, bridges, beams, balconies, facades
- Application on horizontal and vertical incl. overhead areas
- Application thickness from 6 mm (¼“) to 100 mm (4”)
- Used as micro-concrete

System components:
Corrosion pimer: VELOSIT CP 201
Structural repair mortar: **VELOSIT RM 205**
Structural finish mortar: VELOSIT RM 204

Properties

VELOSIT RM 205 is a shrinkage compensated cementitious repair mortar with quick strength development. VELOSIT RM 205 binds the mixing water fast reducing or completely eliminating the need for water curing and protection.
VELOSIT RM 205 creates an extremely well bonded, rigid abrasion resistant layer on the substrate.

VELOSIT RM 205 surpasses the requirements of EN 1504-3 class R4 for concrete repair (CR) and can be used according to the principles 3, 4 and 7 acc. to EN 1504-9.

VELOSIT RM 205 can be applied by trowel or suitable spray equipment.

- Minimal shrinkage/expansion under dry resp. wet curing conditions minimizing the risk of micro-cracking
- Excellent workability
- Wide range of water addition
- Fiber reinforced
- Hydrophobic

- Advanced corrosion inhibitor technology
- 60 min. working time and 12 MPa (1740 psi) compressive strength after 4 hours
- Final strength of more than 45 MPa (6525 psi) after 28 days
- Open to foot traffic after 3 – 4 hours
- Excellent adhesion to properly prepared concrete
- Water curing only under hot and dry conditions required for 3 – 4 hours
- Good resistance against CO_2 and Chloride penetration due to a very tight pore structure
- Good resistance against aggressive media with a pH range of 3-12 and against soft water with low ion content
- Good weathering resistance
- Good sulfate resistance
- Light gray color close to concrete color

Application

1.) Substrate preparation

VELOSIT RM 205 is designed for concrete substrates. Steel may be coated with a VELOSIT CP 201 bonding bridge.

a.) Steel must be prepared to a purity of SA 2.5 acc. SIS 05 5900. Apply a corrosion protection coat on rebar with VELOSIT CP 201.

b.) Concrete substrates must be prepared with sand blasting, shot blasting or ideally high pressure water blasting (> 100 bar/1450 psi) to remove all bond breaking substances.

Remove all carbonated concrete. Test with Phenolphthalein or other suitable indicator until concrete with sufficient alkalinity for rebar protection is reached. If rebar is exposed remove concrete at least 25 mm (1“) behind rebar to fully embed the steel into VELOSIT RM 205.

Substrate must be rough, open porous and load bearing. The minimum requirement for adhesive strength is 2.0 MPa (290 psi) and for the compressive strength 30 MPa (4350 psi). Active water leaks must be treated and fully stopped with VELOSIT PC 221. Leaking cracks need to be sealed with a PU injection material. Before the application of VELOSIT RM 205, dampen the substrate with clean water to a saturated surface dry (SSD) condition.

c.) Concrete repair acc. EN 1504-9 principle 3, 4 or 7 requires a prime coat with VELOSIT CP 201 on concrete and rebar surface to ensure best adhesion strength results.

2.) Processing

Mixing: Mix VELOSIT RM 205 with 11 – 16 % potable water, i.e. 2.8 – 4.0 l (0.7 – 1.0 gal.) water per 25 kg (55 lb.) bag. Fill the 11 % mixing water (2.8 l per bag) into a suitable bucket and mix the powder with a slow speed drill (300-600 rpm) into the water until a lump-free mix is achieved. Add more water (max. 5 %) under stirring until the desired consistency is achieved.
The product is workable for 60 min. at 23 °C.

Priming: Apply a prime coat of VELOSIT CP 201 before applying VELOSIT RM 205 onto concrete.

a.) Trowel application:
Trowel VELOSIT RM 205 can be applied fresh in fresh into the prime coat. The product can be applied up to 100 mm (4”) on vertical areas. Make sure to work in sections that can be finished within 60 min. Rebars and other penetrations must be fully embedded into the mortar.

b.) Spray application:
Use suitable spray machines such as:
- PFT GmbH: PFT G4
- HighTech GmbH: HighComb Big
- Wagner GmbH: PC 25
- Putzmeister GmbH: SP12 or MP 25
- Inotec GmbH: INOMAT-M8

In mixing pumps feed the powder into the product hopper and adjust the water to the desired consistency.

With mortar pumps add the mixed product as described under „Mixing“ into the feed hopper of the spray machine and spray continuously.
If a smooth surface is required, follow with a trowel shortly after material is sprayed. Work in sections.

Long spray interruptions may result in clogging of the spray hose. The product may cure a lot faster if the hose is exposed to direct sunlight. Always empty and flush the machine after spraying or before long spray interruptions. VELOSIT RM 205 is a fast curing material and may be hard to remove if left in the machine.

c.) VELOSIT RM 205 can be mixed to a very plastic consistency and used as a micro-concrete. Pour the product into the shuttering and make sure to compact the pour properly for example with suitable vibration equipment.

3.) Curing

VELOSIT RM 205 does not require long term curing as it reacts relatively fast with water. Only under hot weather or very dry conditions water curing for 3 – 4 hours is required.

Estimating

Repair of surface defects:

25 kg (55 lbs.) VELOSIT RM 205 result in approx. 13.3 liter (0.46 ft^3) cured mortar.

Surface Coating:
45 kg (100 lbs.)* VELOSIT RM 205 per m^2 (10.7 ft^2) for 25 mm (1”) dry mortar thickness on smooth substrates. Depending on surface roughness application rates can be significantly higher.
* 45 kg VELOSIT RM 205 powder + 5.4 kg water, i.e. 50.4 kg mixed material per 25 mm and m^2

Cleaning

VELOSIT RM 205 can be removed in the fresh state with water. Once it has cured acidic cleaners like muriatic acid and mechanical cleaning are required.

Quality features

Color:	gray
Mixing ratio by weight:	100 : 12
Mixing ratio by volume:	100 : 20
Density:	1.7 kg/l
Substrate temperature:	5 – 35 °C (40 – 95 °F)
Initial set:	120 min.
Final set.	200 min.
Compressive / flexural strength:	
4 hours:	12 / 3 MPa (1740/335 psi)
24 hours:	27 / 6 MPa (3916/870 psi)
7 days:	41 / 8 MPa (5946/1160 psi)
28 days:	50 / 8 MPa (7250/1160 psi)
Chloride ions:	< 0.05 %
Carbonation resistance:	passed
Capillary water absorption:	0.1 $kg/m^2 \times h^{0.5}$
Adhesive strength*:	
- primed with CP 201:	2.2 MPa (319 psi)
Restrained shrinkage*:	2.1 MPa (305 psi)

*acc. EN 1542. Adhesion depends very much on proper surface preparation!

Packaging

VELOSIT RM 205 is available in 25 kg (55 lb.) watertight plastic bags.

Storage

VELOSIT RM 205 can be stored in unopened original packs for 12 months at 5 – 35 °C (40 – 95 °F) in a dry storage place protected against sunlight.

Safety

Please observe the actual valid material safety data sheet and follow the described safety measures for handling of the product.

Recommendations

VELOSIT RM 205 is only available for professional applicators.

Never add water to VELOSIT RM 205 when it has started to set. Stiffened material must be disposed.

VELOSIT RM 205 creates significant heat of hydration. Especially in warm conditions and high application thickness sufficient heat exchange must be possible. Never encase large bodies of VELOSIT RM 205 in thermal insulation during curing.

All described product features are determined under controlled laboratory conditions according to the relevant international standards. Values determined under job site conditions may deviate from the stated values.

Please always use the latest version of this data sheet available from our website www.velosit.de.

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VELOSIT RM 205

DIN EN 1504-3
Product for Structural and non structural repair for concrete

Compressive strength	R4
Chloride ion content	≤ 0.05 %
Adhesive bond	≥ 2.0 MPa
Restrained shrinkage/ expansion	≥ 2.0 MPa
Reaction to fire	E

Manufacturer

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