

VELOSIT® RM 211

Crystalline Concrete Repair Mortar R3



Application fields

VELOSIT RM 211 is a crystalline cementitious repair mortar for concrete restoration acc. to EN 1504-9. It creates a smooth surface for crystalline waterproof coatings. Typical application fields besides others are as follows:

- Repair of surface defects on concrete
- Overlays and repairs on concrete structures like dams, bridges, beams, balconies, facades
- Application on horizontal and vertical
- Filling of blow holes, honeycombs and surface roughness
- Application thickness from feather-edge to 25 mm (1")

System components:

Crystalline plug cement: VELOSIT PC 222

Structural repair mortar: **VELOSIT RM 211**

Waterproofing: VELOSIT CW 111

Properties

VELOSIT RM 211 is a shrinkage compensated crystalline cementitious repair mortar with quick strength development. VELOSIT RM 211 binds the mixing water fast reducing or completely eliminating the need for water curing and protection. VELOSIT RM 211 creates an extremely well bonded, rigid abrasion resistant layer on the substrate.

VELOSIT RM 211 surpasses the requirements of EN 1504-3 class R3 for concrete repair (CR) and can be used according to the principles 3, 4 and 7 acc. to EN 1504-9.

VELOSIT RM 211 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
- Fiber reinforced
- 45 min. working time and 12 MPa (1740 psi) compressive strength after 4 hours

- Final strength of more than 40 MPa (5800 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 max. 4 hours
- Good resistance against CO₂ 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 211 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. Other steel areas can be primed with VELOSIT PR 303 with a full broadcast. Steel may expand and contract differently under temperature changes than a cementitious mortar. Thus steel application is only recommended if steel is embedded in larger concrete bodies or the temperature is not subject to major changes.

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 6 mm (1/4") behind rebar to fully embed the steel into VELOSIT RM 211.

Substrate must be rough, open porous and load bearing. The minimum requirement for adhesive strength is 1.5 MPa (218 psi) and for the compressive strength 25 MPa (3625 psi). Lower strength values can be accepted if lower adhesive strength is acceptable. 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 211, dampen the substrate with clean water to a saturated surface dry (SSD) condition.

2.) Processing

Mixing:
Mix VELOSIT RM 211 with 17 – 20 % potable water, i.e. 4.3 – 5.0 l (1.1 – 1.3 gal.) water per 25 kg (55 lb.) bag. Fill 17 % mixing water (4.3 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 up to 3 % water under stirring to adjust desired consistency is. Clean mixing paddle immediately after mixing. The product is workable for 45 min. at 23 °C.

a.) Trowel application:
Apply a slurry coat of VELOSIT RM 211 by scrubbing material with a wet sponge into the concrete surface. Trowel VELOSIT RM 211 fresh in fresh into the slurry coat. The product can be applied up to 25 mm (1") on vertical areas. Make sure to work in sections that can be finished within 30 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 above 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 211 is a fast curing material and may be hard to remove if left in the machine.

3.) Curing

VELOSIT RM 211 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 211 result in approx. 15.2 liter (0.53 ft³) cured mortar.

Surface Coating:

10 kg (22 lbs.)* VELOSIT RM 211 per m² (10.7 ft²) for 6 mm (1/4") dry mortar thickness on smooth substrates. Depending on surface roughness application rates can be significantly higher.

* 10 kg VELOSIT RM 211 powder + 1.8kg water, i.e. 11.8kg mixed material per 6 mm and m²

Cleaning

VELOSIT RM 211 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 : 18
 Mixing ratio by volume: 100 : 28

Density: 1.6 kg/l
 Substrate temperature: 5 – 35 °C
 (40 – 95 °F)

Initial set: 75 min.
 Final set: 120 min.

Compressive / flexural strength:
 4 hours: 12 / 3 MPa (1740/335 psi)
 24 hours: 22 / 4 MPa (3190/580 psi)
 7 days: 28 / 6 MPa (4060/870 psi)
 28 days: 40 / 8 MPa (5800/1160 psi)

Chloride ions: < 0.05 %
 Carbonation resistance: passed
 Capillary water absorption: 0.1 kg/m² x h^{0.5}
 Adhesive strength*: 2.0 MPa (290 psi)
 Restrained shrinkage*: 2.0 MPa (290 psi)
 Fire rating EN13501-1: Class A1

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

Packaging

VELOSIT RM 211 is available in 25 kg (55 lb.) watertight plastic bags.

Storage

VELOSIT RM 211 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 211 is only available for professional applicators.

Never add water to VELOSIT RM 211 when it has started to set. Stiffened material must be disposed.

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.

Manufacturer

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