

VELOSIT® RM 208

High Strength Structural Concrete Repair Mortar R4

Description

VELOSIT® RM 208 is a microsilica enhanced cementitious repair mortar that is mixed with water to become an R4 structural repair mortar according to EN 1504-3. It is used to fill large voids or build up larger cross-sections up to 50 mm. VELOSIT® RM 208 is a shrinkage compensated cementitious repair mortar with quick strength development. VELOSIT® RM 208 is based on a complex formulation of mineral and organic identifiers and additives. It's optimized grading allows for a very dense packing, which improves the cohesiveness and watertightness. VELOSIT® RM 208 creates an extremely well bonded, rigid abrasion resistant layer on the substrate. This product is formulated to be RCS (respirable crystalline silica) free and is manufactured using dust reduction technology.

Uses

- 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 to 50 mm.
- Used as micro-concrete.
- Can be applied by trowel or suitable spray equipment.

Product Compliance

Meets, or exceeds, the performance requirements of EN 1504-3 structural class R4.

Design Criteria

VELOSIT® RM 208 exhibits a series of performance characteristics designed to achieve maximum compatibility with concrete with a compressive strength of up to 70 MPa and is classified as an R4 structural repair mortar in accordance with EN 1504-3. It can be applied from 6 mm and up to 50 mm thickness.

Features & Benefits

- Minimal shrinkage/expansion under dry resp. wet curing conditions minimizing the risk of micro-cracking.
- Fiber reinforced.
- 60 min. working time and extended finishing window.
- Final strength of more than 65 MPa after 28 days.
- Excellent adhesion to properly prepared concrete.
- 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.

Compatible Materials

Substrates: Concrete, steel reinforcement bars. Contact Hychem Infrastructure Technical Support prior to use with masonry, cement compatible porous natural stones and embedded steel.

System components

Can be used as a standalone mortar or in a system with VELOSIT® CP 201. Overlays and overcoating with materials which are typically compatible with concrete: The concrete repair mortar may be suitable for overcoating and other overlays suitable for concrete. It is good practice to confirm adhesion and compatibility with the supplier of the overlay prior to application to the prepared cured repair mortar,

Applicator Material List

VELOSIT® CP 201 Bonding primer & corrosion protection (if using), VELOSIT® RM 208, potable water.

Product Data

Characteristic	Result
Appearance	Grey Powder
Respirable Crystalline Silica	<0.1% RCS



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Technical Data

The following results were obtained at a water addition of 12% by weight. Samples were prepared and tested in a laboratory at a temperature of 20 °C and 65% relative humidity.

Performance Characteristic	Test Method	EN 1504-3 Class R4 Requirement	Test Result
Compressive Strength	EN 12190	≤ 0.05%	24 hours: 21 MPa 28 days: 69 MPa
Chloride Ion Content	EN 1015-17	≤ 0.05%	< 0.05%
Adhesive Bond	EN 1542	≥ 2.0 MPa	Primed with CP 201 2.0 MPa
Restrained shrinkage/ expansion	EN 12617-4	≥ 2.0 MPa	> 2.0 MPa
Carbonation Resistance	EN 13295	$d_k \leq \text{ref concrete}$	Passed
Capillary Absorption	EN 13057	≤ 0.5 kg.m ⁻² .h ^{-0.5}	0.1 kg/m ² × h ^{0.5}
Flexural Strength	EN 196-4	Not applicable	24 hours: 3 MPa 28 days: 10 MPa

Application Data

Property	Property Value
Mixing ratio by weight	100 : 16
Mixing ratio by volume	100 : 27
Density	1.7 kg/L
Substrate temperature	5–35 °C
Working time	60 min. at 23 °C.
Setting time	Initial set: 120 minutes Final set: 240 minutes

Build Characteristics by Application orientation and method (typical maximum thickness in a single layer)		
	Hand/Trowel	Wet Spray
Horizontal - Overhead	30 mm	20 mm
Horizontal - Floor	50 mm	50 mm
Vertical	50 mm	30 mm

Application Guidelines

SUBSTRATE & SURFACE PREPARATION

Concrete

Concrete substrates must be mechanically sound and have attained a minimum compressive strength of 30 MPa. The minimum requirement for adhesive strength is 2.0 MPa.

Mark out around the areas to be repaired. The perimeter of the repairs shall be kept to simple square or rectangular shapes. Saw cut around the perimeter and completely remove all loose, delaminated and unsound concrete, oil, grease, laitance and other contaminants.

Steel

Corroded steel must be fully exposed and cleaned by abrasive blasting, high pressure water blasting, or

mechanical wire brushing.

A minimum of 25 mm breakout around the exposed steel must be achieved to allow steel to be encapsulated by VELOSIT® RM 208. Rust, loose material and other contaminants which may contribute to bonding or corrosion issues shall be totally removed.

Priming

Soak the prepared repair area with clean water and thoroughly remove any excess water. Concrete shall be saturated and free of standing water at time of placement. Where required, apply an unbroken coat of VELOSIT® CP 201 totally encapsulating the steel. The repair mortar may be applied to the VELOSIT® CP 201 either wet-on-wet or wet-on-dry.





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Mixing

Potable water required is 3.1–3.6 litres per 20 kg bag of VELOSIT® RM 208. Do not exceed maximum water addition. Place the minimum required amount of clean water into a large mixing container.

Slowly add VELOSIT® RM 208 to the water and mix for 2 to 3 minutes using a slow speed drill and paddle mixer.

If necessary, add additional clean water until a mix of the desired consistency is achieved. Total mixing time will be 3 to 5 minutes. Do not mix for less than the recommended 3 minutes.

Do not mix more material than can be placed within the working time of the material. The working time for VELOSIT® RM 208 is 60 minutes.

It is recommended to mix the full 20 kg bag of VELOSIT® RM 208 for all applications.

Pan, or Mortar Mixers are suitable for the mixing of multiple bags, i.e. stationary barrel with moving blades. Concrete Mixers should not be used.

Application Method

Concrete surface shall be saturated and free of standing water during application. Apply the mixed VELOSIT® RM 208 by hand, trowel or wet mix spray immediately after mixing. Apply a thin scrub coat of repair material and work firmly into the roughened substrate. Follow immediately by firmly applying a layer of repair material over the wet scrub coat.

The mortar must be pressed and compacted firmly on to the substrate to ensure all voids are filled, paying close attention to compacting behind all prepared steel reinforcement.

Application may be in a single lift, or in layers that prevent sagging. For multiple lift applications, scratch surface of initial lift to create a mechanical key for the next lift. Allow initial lift to stiffen sufficiently to hold next lift. Dampen initial lift with water and then place second lift, working repair material into initial lift. Placement shall proceed continuously until area is filled completely.

VELOSIT® RM 208 can also be applied by Wet Spray Application. Contact Hychem™ Technical Service for guidance on suitable spray equipment and spray application guidelines.

Finishing

Finish the VELOSIT® RM 208 to the desired texture when it offers stiff resistance. A wood float, sponge float, brush, or trowel may be used for finishing.

Curing

VELOSIT® RM 208 must be wet cured. Wet curing should begin approximately 60 minutes after placement, i.e. once

initial set has been achieved, and continue for 3 to 4 hours. Alternatively, cover the surface with a polythene sheet, taping down the edges after the initial wet cure.

Where the ambient temperature exceeds 32 °C and where the repair area will not be overcoated, an approved curing compound may be considered after initial wet curing.

Quality Control

The execution of the work shall be carried out in accordance with the project quality plan. Refer to EN 1504-10 Table 5 for the requirements related to quality control tests and observations.

Clean Up

VELOSIT® RM 208 should be removed from tools, equipment and mixers in the fresh state with water immediately after use. Once it has cured acidic cleaners like muriatic acid may assist and mechanical cleaning will be required.

Limitations

Design: Where VELOSIT® RM 208 is used as a thin build layer it may not be considered to be a structural repair or suitable for traffic. Additional protection measures may be required for resistance to chemicals, extreme and aggressive conditions. Steel may expand and contract differently under temperature changes than a cementitious mortar. Therefore, application to steel (excluding rebar) is only recommended if steel is embedded in larger concrete bodies or the service temperature is not subject to major changes. This mortar is not suitable for use with galvanic anodes.

Application: Not to be used when the temperature is below 5 °C and falling. Apply only to sound, prepared substrate. It should not be exposed to moving water during application. Exposure to heavy rainfall prior to final set may result in surface scour. Avoid application in direct sun and/or strong wind. Do not add water over recommended dosage. Do not apply mortar above the maximum recommended thickness.

Do not add other additives. Aggregate may be added but only under the guidance of Hychem™ Infrastructure. Do not add additional water during the surface finishing as this will negatively affect the performance properties and may lead to cracking, laitance and discoloration. Protect freshly applied material from freezing.

If any doubts arise concerning suitability for use, application temperature or substrate conditions, contact Hychem™ Infrastructure Technical Support for advice.

VELOSIT RM 208 is only available for professional applicators. Never add water to VELOSIT RM 208 when it has started to set. Stiffened material must be disposed of.

All described product features are determined under





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

ESTIMATING

20 kg of VELOSIT® RM 208 will yield approximately 10.6 litres of cured mortar @ 12% water.

COVERAGE

20 kg of VELOSIT® RM 208 powder and 3.3 litres of water (23.3 kg of mixed material) per m² @ 11 mm thick; or 1 litre / m² / mm thick.

PACKAGING

20 kg watertight plastic bags.

STORAGE

The product is to be stored in unopened original packaging for up to 24 months at 5–35 °C in a dry storage place that is protected against exposure to sunlight. Refer to label on bag for expiry date.

Safety

In an emergency, contact 000, the Poisons Information Centre (13 11 26 within Australia) or a doctor for advice. Please refer to the current SDS (Safety Data Sheet) and follow the prescribed safety precautions and handling procedures for the product. This material is RCS free.

Warranties and Disclaimers

Hychem™ warrants that this product shall conform to the technical specifications published in the product literature. The quality and fitness of the product are dependent upon its proper use and application by the applicator. Hychem's role is limited to the manufacture and supply of the product and its components and does not extend to supervision or control of its application. It is vital that the person applying this product understands its properties and limitations and is appropriately trained and competent in the use of the equipment, methods and materials associated with its application. There are no warranties that extend beyond the description contained herein, except where provided in writing directly by Hychem™ and executed under seal by a company officer.

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