Construction

Sika® MonoTop®-412 NFG

R4 Structural Repair Mortar with Corrosion Inhibitor

Product Description

Sika® MonoTop®-412 NFG is a 1-component, polymer modified, fibre reinforced, low shrinkage structural repair mortar with corrosion inhibitor meeting the requirement of class-R4 of EN 1504-3.

Uses

- Suitable for restoration work (Principle 3, method 3.1 & 3.3 of EN 1504-9). Repair of spalling and damaged concrete in buildings, bridges, infrastructure and superstructure works.
- Suitable for structural strengthening (principle 4, method 4.4 of EN 1504-9). Increasing the bearing capacity of the concrete structure by adding mortar.
- Suitable for preserving or restoring passivity (principle 7, method 7.1 and 7.2 of EN 1504-9). Increasing cover with additional mortar and replacing contaminated or carbonated concrete.

Characteristics / Advantages

- Polymer modified for increased durability
- Superior workability and finishing
- Suitable for hand and machine application
- Can be applied up to 50 mm thick per application layer
- Class R4 of EN 1504-3
- Structural repair
- Very low shrinkage behaviour
- Contains corrosion inhibitor
- Low chloride permeability
- A1 fire rating

Tests

Approval / Standards

MPA Stuttgart, Fire Classification and Test Reports, 901 5975 000/09 1-3 dated 28th September 2009.

Sika Corporation R&D, Rapid Chloride Permeability and Electrical Resistivity of SMT-412 NFG to ASTM C-1202 report N° dated 25.05.2010.

Product Data

Form

Appearance / Colour	Grey powder
Packaging	20kg bag

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Storage

Storage Conditions / Shelf-Life	12 months from date of production if stored properly in undamaged original sealed packaging, in dry cooled conditions.

Technical Data

Chemical Base	Portland cement, corrosion inhibitor, selected aggregates and polymer modified.	
Density	Fresh mortar density: ~2.10 kg/l	
Grading	D_{max}: 2.0 mm	
Layer Thickness	6 mm min / 50 mm max.	
Shrinkage	~ 600 µm/m @ 23°C 50% relative humidity at 28 days	(AS 1472.8)
Thermal Expansion Coefficient	10.5 10^{-6} m/m.°C	(EN 1770)
Chloride Ion Penetrability Class	Very low	(ASTM C-1202)

Mechanical / Physical Properties — 20°C in lab conditions

Compressive Strength (AS 1472.8)

1 day	7 days	28 days
~ 15 N/mm² (MPa)	~ 40 N/mm² (MPa)	~ 52 N/mm² (MPa)

Flexural Strength (EN 196-1)

1 day	7 days	28 days
~ 4 N/mm² (MPa)	~ 6 N/mm² (MPa)	~ 7 N/mm² (MPa)

Requirements — Requirements as per EN 1504-3 Class R4 (tested at Water: Powder ratio = 14.5%)

	Test Method	Results (ITT results)	Requirements (R4)
Compressive Strength	EN 12190	≥ 45 N/mm² (MPa)	≥ 45 N/mm² (MPa)
Chloride Ion Content	EN 1015-17	< 0.05 %	≤ 0.05%
Capillary Absorption	EN 13057	≤ 0.5 $kg.m^{-2}.h^{-0.5}$	≤ 0.5 $kg.m^{-2}.h^{-0.5}$
Carbonation Resistance	EN 13295	Pass	Lower than control
Elastic Modulus	EN 13412	≥ 20 kN/mm² (GPa)	≥ 20 kN/mm² (GPa)
Thermal Compatibility Part 1: Freeze-Thaw	EN 13687-1	≥ 2.0 N/mm² (MPa)	≥ 2.0 N/mm² (MPa)
Adhesive Bond	EN 1542	≥ 2.0 N/mm² (MPa)	≥ 2.0 N/mm² (MPa)

System Information

System Structures — Sika MonoTop-412NFG is part of the range of Sika mortars complying with the relevant part of European Standard EN 1504 and comprising of:

Bonding primer and reinforcement corrosion protection

- Sika® MonoTop®-910 N: Normal use
- SikaTop® 110 EpoCem®: Demanding requirements

Repair mortar:

- Sika® MonoTop®-412 NFG: Structural hand & machine applied repair mortar (R4 type)

Fairing coat:

- Sika® MonoTop®-723N: Pore sealer and fairing mortar

Application Details

Consumption	This depends on the substrate roughness and thickness of layer applied. As a guide, ~ 20 kg of powder per cm thick per m^2 1 bag yields approximately 10.9 litres of mortar
Substrate Quality	*Concrete:* The concrete shall be free from dust, loose material, surface contamination and materials which reduce bond or prevent suction or wetting by repair materials. *Steel reinforcement:* Rust, scale, mortar, concrete, dust and other loose and deleterious material which reduces bond or contributes to corrosion shall be removed. Reference should also be made to EN1504-10 for specific requirements
Substrate Preparation / Priming	*Concrete:* Delaminated, weak, damaged and deteriorated concrete and where necessary sound concrete shall be removed by suitable means. *Steel reinforcement:* Surfaces shall be prepared using abrasive blast cleaning techniques or high pressure water-blasting. *Bonding primer:* On a well prepared and roughened substrate a bonding primer is generally not required. When a bonding primer is not required pre-wet the surface. The surface shall not be allowed to dry before application of the concrete repair mortar. The surface shall achieve a dark matt appearance without glistening and surface pores and pits shall not contain water. When a bonding primer is necessary apply Sika® MonoTop®-910 N (refer to the relevant Product Data Sheet) or the same product – Sika® MonoTop®-412 NFG – mixed wetter than normally required, applied well on the substrate with a stiff brush. In both cases, subsequent application of the repair mortar shall be done wet on wet. *Reinforcement corrosion protection:* Where a reinforcement coating is required as a barrier (e.g. in case of insufficient concrete cover), apply to the whole exposed circumference two coats of Sika® MonoTop®-910 (Refer to the relevant Product Data Sheet).

Application Conditions / Limitations

Substrate Temperature	+5°C min.; +30°C max.
Ambient Temperature	+5°C min.; +30°C max.

Application Instructions

Mixing Ratio	~ 2.7 – 3.0 litres of water for 20kg powder
Mixing	Sika® MonoTop®-412 NFG can be mixed with a low speed (< 500 rpm) hand drill mixer or for machine application, using a force action mixer 2 to 3 bags or more at once depending the type and size of mixer. In small quantity, Sika® MonoTop®-412 NFG can also be manually mixed. Pour the water in the correct proportion into a suitable mixing container. While stirring slowly, add the powder to the water. Mix thoroughly at least for 3 minutes to the required consistency
Application Method / Tools	Sika® MonoTop®-412 NFG can be applied either manually using traditional techniques or mechanically using wet spray equipment. When a bonding primer is required, ensure it is still tacky when the repair material is pressed on (wet on wet technique). When applied manually, pressed the repair mortar with a trowel, pressing it well on the substrate. Finishing for both hand and machine application, can be done with the relevant roughcast as soon as the mortar has started to stiffen.

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Cleaning of Tools	Clean all tools and application equipment with water immediately after use. Hardened material can only be mechanically removed.
Potlife	at +20°C: ~ 40 minutes
Notes on Application / Limitations	– Refer to the Method Statement for Concrete Repair using Sika® MonoTop® system for more information regarding substrate preparation or refer to the recommendations provided in EN 1504-10 – Avoid application in direct sun and/or strong wind. – Do not add water over recommended dosage – Apply only to sound, prepared substrate – Do not add additional water during the surface finishing as this will cause discoloration and cracking – Protect freshly applied material from freezing – Overhead hand applications layer thickness 6 mm min / 30 mm max.

Curing Details

Curing Treatment	Protect the fresh mortar from early dehydration using the relevant curing method.

Value Base

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

Health and Safety Information

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Material Safety Data Sheet containing physical, ecological, toxicological and other safety-related data.

Important Notification

The information, and, in particular, the recommendations relating to the application and end-use of Sika's products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The proprietary rights of third parties must be observed. All orders are accepted subject of our terms and conditions of sale. Users should always refer to the most recent issue of the Australian version of the Technical Data Sheet for the product concerned, copies of which will be supplied on request.

PLEASE CONSULT OUR TECHNICAL DEPARTMENT FOR FURTHER INFORMATION.