BUILDING TRUST

BUILDING PRODUCT INFORMATION SHEET

Sika MonoTop®-412 N

R4 FIBRE REINFORCED STRUCTURAL REPAIR MORTAR

DESCRIPTION

Sika MonoTop®-412 N is a 1-component, fibre reinforced, low shrinkage repair mortar 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.
- Tested application under live dynamic loading

FEATURES

- Class R4 of EN 1504-3
- Sulphate resistant
- For hand or machine application
- Easy to apply
- Application up to 50 mm in 1 layer
- Very low shrinkage behaviour
- Does not require a bonding primer even when manually applied
- Low permeability
- A1 fire rating

LIMITATIONS OF USE

The need for concrete repair, as defined in Standard NZS3109 - Concrete Construction, refers primarily to concrete defects arising from construction, placing and finishing actions. Repair options for concrete damage outside the scope of the NZ Building Code and arising from other causes, (e.g. fire, explosion, earthquake, chemical attack, etc) requires specialist engineering expertise to undertake specific project investigation and specification.

APPROVALS / CERTIFICATES

- (BAM) Bundesanstalt für Materialforschung und –prüfung - Prüfung von Instandsetznugsmörtel nr. VII.1/126904/1 dated 1 July 2008
- Measurement of Specific Electrical Mortar Resistance report, Hochschule für Technik Rapperswil, Switzerland dated 14th April 2010

PRODUCT INFORMATION

Product identifier	Sika MonoTop®-412 N
Place of manufacture	Aotearoa New Zealand
Composition	Sulphate resistant cement, selected aggregates and additives
Packaging	25 kg bags
Shelf life	12 months
Storage conditions	Store properly in undamaged original sealed packaging, in dry cool conditions.
Appearance and colour	Grey powder
Maximum grain size	D_{max}: 2 mm

Density	Fresh mortar density ~2.1 kg/l	
Soluble chloride ion content	≤ 0.05%	(EN 1015-17)

TECHNICAL INFORMATION

Compressive strength	Class R4			
	1 day	7 days	28 days	(EN 12190)
	~17 MPa	~40 MPa	~55 MPa	
Modulus of elasticity in compression	≥ 20 GPa		(EN 13412)	
Flexural strength	1 day	7 days	28 days	(EN 12190)
	~4 MPa	~6 MPa	~8 MPa	
Tensile adhesion strength	≥ 2.0 MPa		(EN 1542)	
Shrinkage	~500 µm/m @ 20°C / 65% relative humidity at 28 days		(EN 12617-4)	
Restrained shrinkage / expansion	≥ 2.0 MPa		(EN 12617-4)	
Coefficient of thermal expansion	~10.5 x 10^{-6} 1/K		(EN 1770)	
Electrical resistivity	< 100 kΩ.cm		(EN 12696)	
Thermal compatibility	≥ 2.0 MPa (Part 1- Freeze-Thaw)		(EN 13687-1)	
Capillary absorption	≤ 0.5 kg/(m^2.$h^{0.5}$)		(EN 13057)	
Chloride ion diffusion resistance	Low - < 2000 coulombs		(ASTM C1202)	
Carbonation resistance	d_k ≤ control concrete (MC(0.45))		(EN 13295)	
Reaction to fire	Euro class A1		(EN 1504-3 cl 5.5)	

SYSTEM INFORMATION

System structure	Sika MonoTop®-412 N is part of the range of Sika mortars complying with the relevant part of European Standard EN 1504 and comprising of:	
	Bonding Primer / Reinforcement Corrosion Protection	
	Sika MonoTop®-910 N	Normal Use
	SikaTop® Armatec® 110 EpoCem®	Demanding requirements
	Repair Mortar	
	Sika MonoTop®-412 N	Class R4 concrete repair hand and & machine applied
	Levelling Mortar	
	Sika MonoTop®-723 N	Normal use
	Sikagard®-720 EpoCem®	Demanding requirements

APPLICATION INFORMATION

Mixing ratio	3.6 to 3.9 litres of water for 25 kg powder
Consumption	This depends on the substrate roughness and thickness of layer applied. As a guide, ~ 19 kg of powder per cm thick per m^2
Yield	25 kg of powder yields approximately 13.7 litres of mortar

Layer thickness	min. 6 mm / max. 50 mm
Ambient air temperature	+5 °C minimum; +30 °C maximum
Substrate temperature	+5 °C minimum; +30 °C maximum
Pot Life	~40 minutes at +20°C

MANUFACTURER AND IMPORTER INFORMATION

Manufacturer information	Address	Sika (NZ) Limited 85-91 Patiki Road Avondale, Auckland 1026 New Zealand
	Phone number	0800 745 269
	Website	https://nzl.sika.com/
	Email address	info@nz.sika.com
	NZBN	9429000018791

BUILDING CODE INFORMATION

Building Code clauses	Note: This product is a concrete repair / protection product and on its own is not within the scope of the NZ Building Code. However when used for the repair of defects in concrete (manufactured to NZS3104) arising from the placement and construction process, as defined in NZS 3109: 1997 clauses 7.7.5 and 7.7.6, it will contribute to meeting the requirements of the following NZBC clauses B1 Structure: Performance Clauses B1.3.1, B1.3.2, B1.3.3 (a, b, f, h, m, q) B1.3.4 B2 Durability: Performance clause B2.3.1-(a) not less than 50 years F2 Hazardous Building Materials: Performance clause F2.3.1
Building Code compliance statements	Performance B1.3.1, B1.3.2, B1.3.3 (a, b, f, h, m, q): B1.3.4 Sika MonoTop, Sikacrete, Sikagard and Sikadur concrete repair and protection products comply with their relevant parts within EN1504. (refer to "Refurbishment- Improved Sika Monotop Systems - An Overview For Designers and Specifiers" available at nz.sika.com) When they are used to repair and restore the integrity of damaged or defective concrete, as specified within the scope of NZS3604:2011, they contribute to the concrete meeting the preceding B1 Structure performance clauses Performance B2.3.1 (a) 50 years: This product has been evaluated in accordance with B2/VM1. It meets this durability requirement and will remain serviceable for 50 years, or more, when installed and maintained in accordance with the relevant Sika technical literature. nzl.sika.com. According to Sika's "Service Improvement" records, maintained within its ISO9001:2015 Quality Management System, this product has performed successfully since it was introduced in 2007. Performance F2.3.1: This product meets this requirement when used and applied in accordance with Sika's installation instructions and does not present a health hazard to people occupying or using the building. Refer to the Sika Product Technical Data sheet and product Safety Data Sheet nzl.sika.com for further information if required

BASIS OF PRODUCT DATA

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

IMPORTANT CONSIDERATIONS

- 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 discolouration and cracking
- Protect freshly applied material from freezing

ECOLOGY, HEALTH AND SAFETY

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

APPLICATION INSTRUCTIONS

DESIGN REQUIREMENTS

This product is part of a system that includes primers and other associated products. For full design information refer to the relevant Sika literature avaialbale at nzl.sika.com. For further information or support phone 0800SIKANZ

MIXING

Sika MonoTop®-412 N 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. Pour the recommended water in a suitable mixing container. While stirring slowly, add the powder to the water and mix thoroughly at least for 3 minutes adding additional water during the mixing time if necessary to the maximum specified amount and adjust to the required consistency.

APPLICATION

Bonding Primer: On a well prepared and roughened substrate a bonding primer is generally not required for this product. When a bonding primer is required, refer to the **System Information** above for compatible Sika products and refer to the relevant Product Data Sheet for instructions. All small amount of Sika MonoTop®-412 N can also be mixed slightly wetter than normal and used as a scratch coat to promote adhesion of the repair mortar to the substrate. Any bonding primer shall be applied on a pre-wet substrate and subsequent application of the repair mortar shall be applied wet on wet with the bonding primer.

Reinforcement Corrosion Protection: Where a reinforcement coating is required the application of a repair mortar shall be applied wet on dry with the reinforcement corrosion protection. Refer to the **System Information** above for compatible Sika products and refer to the relevant Product Data Sheet for more detailed information about the reinforcement corrosion product.

Sika MonoTop®-412 N can be applied either manually using traditional techniques or mechanically using wet spray equipment. Thoroughly pre-wet the prepared substrate a recommended 2 hours before application. Keep the surface wet and do not allow to dry. Before application remove excess water e.g. with a clean sponge. The surface shall appear a dark matt appearance without glistening and surface pores and pits shall not contain water.

When manually applying first make a scratch coat by firmly scraping the repair mortar over the substrate surface to form a thin layer and fill any pores or pits in the surface. Ensure the whole surface to be repaired is covered by the scratch coat. Build up layers from bottom to top by pressing mortar well into the repair area. The surface can be finished according to the requirements using a float while wet or with a relevant rough-cast tool as soon as the mortar has started to stiffen.

CURING TREATMENT

Protect the fresh mortar immediately from premature drying using an appropriate curing method e.g. curing compound, moist geotextile membrane, polythene sheet etc.

CLEANING OF EQUIPMENT

Clean all tools and application equipment with water immediately after use. Hardened material can only be mechanically removed.

SUBSTRATE QUALITY

Concrete: The concrete shall be thoroughly clean, free from dust, loose material, surface contamination and materials which reduce bond or prevent suction or wetting by repair materials. De-laminated, weak, damaged and deteriorated concrete and where necessary sound concrete shall be removed by suitable means.

Steel Reinforcement: Rust, scale, mortar, concrete, dust and other loose and deleterious material which reduces bond or contributes to corrosion shall be removed. Surfaces shall be prepared using abrasive blast cleaning techniques or high pressure water-blasting to SA 2 (ISO 8501-1)

Reference shall be made to EN1504-10 for specific requirements.

MAINTENANCE REQUIREMENTS

The maintenance requirements for this Sika product are the same as for the host / surrounding substrate

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for the exact product data and uses.

LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika 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 accordance with Sika's recommendations. 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 user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request. It may be necessary to adapt the above disclaimer to specific local laws and regulations. Any changes to this disclaimer may only be implemented with permission of Sika® Corporate Legal in Baar.

The building product/building product line is not subject to warning or ban under section 26 of the Building Act 2004.

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