

# EKSMAL 1

High performance ready-mix grout, self-levelling, with compensated shrinkage and maximal granulation 1,0 mm

In compliance with EN 1504-3 Class R4 and EN 1504-6

## FIELD OF APPLICATION

Eksmal 1 is used for structural repair of concrete and reinforce-concrete elements, anchor grouting, grouting of foundations under heavy loaded structural elements, bridge bearings, crane beams, base under machines etc.

Eksmal 1 is suitable for:

- Concrete restoration by recasting with concrete (Method 3.2 according to EN 1504-9)
- Structural strengthening by adding mortar or concrete (Method 4.4 according to EN 1504-9)
- Replacing contaminated or carbonated concrete (Method 7.2 according to EN 1504-9)
- Adding reinforcement anchored in pre-formed or drilled holes (Method 4.2 according to EN 1504-9)

## PROPERTIES

- High early and final strength;

	24 hours	28 days
Compressive strength	> 40 MPa	> 80 MPa
Flexural strength	> 6 MPa	> 9 MPa

\* Testing is carried out in laboratory conditions, at temperature of +20°C

- One-component, cement based, powdery material;
- Excellent adhesion to concrete substrate;
- Easy to prepare and apply;
- Self-leveling;
- High elasticity module;
- Compensate shrinkage caused by cement setting;
- Resistant to atmospheric influences;

## TECHNICAL FEATURES

Property	Method	Measured values	Declared values
Appearance	-	Grey powder	Grey powder
Water/Material ratio (Water/Eksmal 1)	-	0,135	0,135 – 0,145
Maximal size of aggregate	-	1 mm	1 mm
Specific density	EN 12190	2350 kg/m <sup>3</sup>	(2320-2420) kg/m <sup>3</sup>
Flow value after 5 min after 30 min after 60 min	EN 13395-2	40 cm 45 cm 40 cm	≥ 35 cm ≥ 35 cm ≥ 35 cm
Setting time Start of setting End of setting	EN 13294	3 h 4 h	(2÷4) h (3÷5) h
Adhesive bond	EN 1542	3,4 MPa, failure in concrete substrate	≥ 2,0 MPa
Compressive strength after 1 day after 28 days	EN 12190	48,9 MPa 87,2 MPa	≥ 30 MPa ≥ 45 MPa
Restrained shrinkage/expansion	EN 12617-4	3,34/3,79 MPa	≥ 2,0 MPa

Thermal compatibility: Freeze-thaw cycling with de-icing salt immersion	EN 13687-1	3,94 MPa	≥ 2,0 MPa
Carbonation resistance	EN 13295	pass	dk ≤ control concrete
Capillary absorption	EN 13057	0,0671 kg.m <sup>-2</sup> .h <sup>-0,5</sup>	< 0,5 kg.m <sup>-2</sup> .h <sup>-0,5</sup>

## METHODOLOGY FOR APPLICATION

### SUBSTRATE PREPARATION

Substrate on which Eksmal 1 is applied must be clean, firm, all unstable sections must be removed, as well as residues of dust and oil. Concrete substrate must be saturated with water. Surface temperature on which material is applied must be between 5°C and 30°C.

In case of reparation of reinforced concrete structures, exposed steel reinforcement must be mechanically cleaned from corrosion prior to grouting (using steel brush or sand-blasting).

### APPLICATION

Eksmal 1 is mixed with required quantity of water - for one bag of material (25 kg) required quantity of water is 3.3 to 3.6 liters. Mixing is carried out with slow mixer (~500 rot/min), until complete homogenization (min. 3 minutes). Mixture should be leaved to rest for 2-3 minutes, than mixed again and applied by grouting. Material must be protected from high temperatures (above 30°C), from exposure to direct sunlight and wind, and it should be cured with water or other appropriate method for curing of concrete.

It is recommended to use Eksmal 1 for grouting of sections with thickness up to 2.0 cm. For grouting larger/thicker sections it is recommended to use Eksmal with larger aggregate fractions (Eksmal 4,8,16,32). Reason for these recommendation is to improve economic aspect of the construction, as well as to reduce negative effects from exothermic processes that occur when concreting large concrete sections.

For grouting large sections with Eksmal 1, grouted surface needs to be divided with construction joints in sections (with surface approximately 1 m<sup>2</sup>). Additionally, joints can be filled with epoxy-based sealant (for obtaining flat monolith surface) or with elastic sealant (that allows unrestrained dilatation during exploitation).

### GROUTING OF ANCHORS

In cases when steel anchor is grouted with Eksmal 1, drilled hole (in which anchor is inserted) must be with diameter minimum 6 mm wider than anchor diameter (radius of the hole need to be minimum 3 mm wider than the anchor radius). Opening in which anchor is installed need to be clean, free of dust, and the surrounding concrete need to be saturated with water. In cases when anchor is installed horizontally on vertical surface, hole need to be drilled with angle (slope pointing downward) in order to avoid spillage of the material. Eksmal 1 is poured in the anchor-hole (app. 1/2 of the depth), than anchor is inserted and the excess material will overflow, thus completely filling the space between anchor and the surrounding concrete.

### CONSUMPTION

2200 kg Eksmal 1 are used for preparation of 1m<sup>3</sup>.

### CLEANING

Tools and equipment are cleaned with water immediately after their use.

### PACKAGING

Bags: 6 kg

Bags: 25 kg

## STORAGE

In the original closed packaging, in dry free spaces at temperature between 5°C and 35°C. Shelf life: 12 months.

## CE MARKING

<b>CE</b> 2032	
ADING AD Skopje, Novoselski pat (ul 1409) br.11 1060 Skopje, North Macedonia 17, 20 GBCA001/7 EN 1504-3:2005 EN 1504-6:2006 <b>EKSMAL 1</b> Concrete repair product for structural repair – mortar based on based on hydraulic cement (CC)	
<b>According to EN 1504-3</b>	
Compressive strength	<b>≥ 45 N/mm<sup>2</sup> (class R4)</b>
Chloride ion content	<b>≤ 0,05%</b>
Adhesive bond	<b>≥ 2,0 N/mm<sup>2</sup></b>
Restrained shrinkage/expansion	<b>Bond strength after test ≥ 2,0 N/mm<sup>2</sup></b>
Carbonation resistance	<b>d<sub>k</sub> ≤ control concrete (MC 0,45)</b>
Elastic modulus	<b>≥ 20 GPa</b>
Thermal compatibility: Freeze-thaw cycling with de-icing salt immersion	<b>Bond strength after 50 cycles ≥ 2,0 N/mm<sup>2</sup></b>
Capillary absorption	<b>≤ 0,5 kg/m<sup>2</sup> · h<sup>0,5</sup></b>
Reaction to fire	<b>Class A1</b>
Dangerous substances	<b>No performance determined</b>
<b>According to EN 1504-6</b>	
Pull-out strength	<b>Displacement ≤ 0,6 mm at load of 75kN</b>

**Health hazards:** Eksmal 1 does not contain toxic materials. Nevertheless, avoid contact of the product with skin and eyes and avoid swallowing. In case of contact with skin or eyes, rinse it immediately with clean running water. If swallowed, seek medical assistance. Additional information are provided in the Safety Data Sheet of the product.

**Fire:** Eksmal 1 is non-flammable.

**Cleaning and disposal:** Loose residues of Eksmal 1 should be cleaned with water. Old and used packaging should be disposed of in accordance with local rules and regulations for that type of waste. Additional information are provided in the Safety Data Sheet of the product.