

# EKSMAL 4

*Ready-mix self-leveling grout, with compensated shrinkage, maximal aggregate 4,0 mm.  
In compliance with EN 1504 – 3 Class R4*

## FIELD OF APPLICATION

Eksmal 4 is used in structural reparation of concrete and reinforce-concrete elements, anchor grouting, grouting of foundations under heavy loaded structural elements, crane beams, base under machines etc.

## PROPERTIES

- one-component powdery material;
- easy to prepare and apply;
- self – leveling;
- high early and final strength;
- compensate shrinkage caused by cement setting;
- excellent adhesion to concrete substrate;
- excellent durability performances;
- high elasticity module;
- resistant to atmospheric influences;

## TECHNICAL FEATURES

Property	Method	Measured values	Declared values
Appearance	-	Grey powder	Grey powder
Water/material ratio	-	0,115	0.110 - 0.130
Maximal size of aggregate	-		4 mm
Specific density	EN 12190	2366 kg/m <sup>3</sup>	(2250 - 2450) kg/m <sup>3</sup>
Flow value			
after 5 min		≥43 cm	≥35 cm
after 15 min	EN 13395-2	≥45 cm	≥35 cm
after 30 min		≥46,5 cm	≥35 cm
after 60 min		≥41 cm	≥35 cm
Setting time			
Start of setting	EN 13294	03:00	(2÷4)h
End of setting		04:00	(3÷5)h
Compressive strength			
after 1 day	EN 12190	36.4 MPa	≥30 MPa
after 28 days		63.6 MPa	≥55 MPa
Adhesive bond	EN 1542	3.4 MPa	≥ 2,0 MPa
Restrained shrinkage/expansion	EN 12617-4	3.5/3.5 MPa	≥ 2,0 MPa
Thermal compatibility: Freeze-thaw cycling with de-icing salt immersion	EN 13687-1	3.4 MPa	≥2,0 MPa
Carbonization resistance		pass	dk≤ control
Capillary absorption	EN 13057	0,059kg ·m <sup>-2</sup> ·h <sup>-0,5</sup>	≤ 0,5 kg ·m <sup>-2</sup> ·h <sup>-0,5</sup>

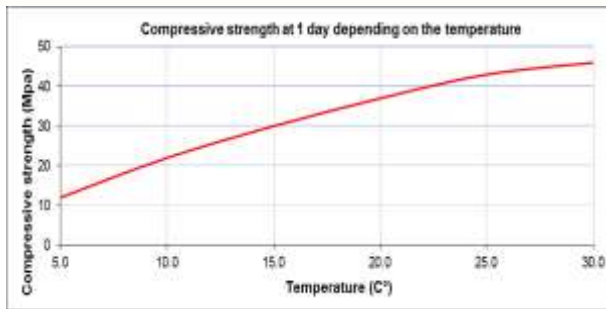


Diagram 1

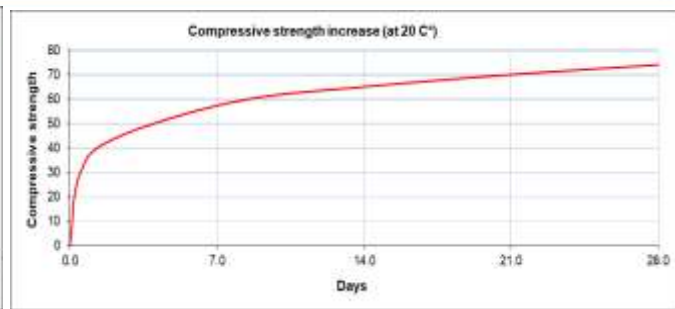


Diagram 2

## METHOD STATEMENT:

### SUBSTRATE PREPARATION

Substrate on which Eksmal 4 is applied must be clean, all unstable sections must be removed, dust and oil free, and saturated with water. Surface temperature on which material is applied must be between 5°C and 30°C.

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

### APPLICATION

Eksmal 4 is mixed with required quantity of water- for one bag of material (25 kg) required quantity of water is 3.3 to 3.6 kg. Mixing is carried out with slow mixer (~500 rot/min) at least 3 minutes, until complete homogenization. Mixture is 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, as well as cured with water (or other appropriate curing method) in first few hours after application. It is recommended to use Eksmal 4 for grouting of sections with thickness from 2.0 cm to 4.0 cm. For thinner sections, it is recommended to use Eksmal 1 and for larger sections, it is recommended to use Eksmal – 4 with addition of larger aggregate suitable for production of concrete. 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. Proportions of mixing Eksmal – 4 aggregate fractions are included in the following table :

Recommended thickness of intersection	Eksmal 4	Aggregate 4-8 mm	Aggregate 8-16 mm	Aggregate 16-32 mm	Water
20 mm ÷ 80 mm	25 kg	8,0 kg	/	/	3.0÷3.6 kg
80 mm ÷ 160 mm	25 kg	2,5 kg	10 kg	/	3.0÷3.7 kg
> 160 mm	25 kg	3,0 kg	5 kg	6,5 kg	2.6÷3.4 kg

For grouting large sections with small thickness, it is recommended to install steel reinforcement mesh anchored to the concrete base (min.4 anchors/1m<sup>2</sup>). Otherwise, surface needs to be divided in sections with construction joints, immediately after the setting of the material. In addition, joint can be filled with epoxy-based sealant (for obtaining flat monolith surface) or with elastic sealant (in cases when surface need to “work” – expand and contract during exploitation).

### CONSUMPTION

2000 to 2200 kg material are used for preparation of 1m<sup>3</sup> Eksmal 4.

### 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 premises at temperature between 5°C and 35°C. Shelf life: 12 months.

## CE MARKING

 2032	
<b>ADING AD Skopje</b> <b>Novoselski pat (street 1409)No.11, 1060</b> <b>Skopje, Republic of North Macedonia</b> <b>11</b> <b>GBCB001/6</b> <b>EN 1504-3:2005</b> <b>EKSMAL 4</b> <b>Concrete repair product for structural repair CC mortar (based on hydraulic cement)</b>	
<b>Compressive strength:</b>	<b>Class R4</b>
<b>Chloride ion content:</b>	<b>≤ 0.05%</b>
<b>Adhesive bond:</b>	<b>≥ 2.0MPa</b>
<b>Carbonation resistance:</b>	<b>Passes</b>
<b>Elastic modulus:</b>	<b>≥ 20 GPa</b>
<b>Thermal compatibility, part 1:</b>	<b>≥ 2.0 MPa</b>
<b>Capillary absorption:</b>	<b>≤ 0,5 kg*m<sup>-2</sup>*h<sup>-0.5</sup></b>
<b>Reaction to fire:</b>	<b>Euroclass A1</b>

**Health hazards:** Eksmal 4 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 4 is non-flammable.

**Cleaning and disposal:** Loose residues of Eksmal 4 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.