

EKSMAL 4

High performance ready-mix grout, self-leveling, with compensated shrinkage, maximal granulation 4,0 mm

In compliance with EN 1504-3 Class R4

FIELD OF APPLICATION

Eksmal 4 is used for structural reparation 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 4 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)

PROPERTIES

- High early and final strength;

	24 hours	28 days
Compressive strength	> 45 MPa	> 80 MPa
Flexural strength	> 6 MPa	> 10 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 4)	-	0,12	0.110 - 0.130
Maximal size of aggregate	-	4 mm	4 mm
Specific density	EN 12190	2372 kg/m ³	(2250 - 2450) kg/m ³
Flow value			
after 5 min	EN 13395-2	43 cm	≥35 cm
after 30 min		48 cm	≥35 cm
after 60 min		42 cm	≥35 cm
Setting time			
Start of setting	EN 13294	3 h	(2÷4)h
End of setting		4h	(3÷5)h
Compressive strength			
after 1 day	EN 12190	51 MPa	≥30 MPa
after 28 days		91 MPa	≥55 MPa
Adhesive bond	EN 1542	3.3 Mpa, faliure in concrete substrate	≥ 2,0 MPa

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Restrained shrinkage/expansion	EN 12617-4	3.5/3.5 MPa	≥ 2,0 MPa
Thermal compatibility:	EN 13687-1	3.4 MPa	≥2,0 MPa
Freeze-thaw cycling with de-icing salt immersion			
Carbonization resistance		pass	dk≤ control

METHODOLOGY FOR APPLICATION

SUBSTRATE PREPARATION

Substrate on which Eksmal 4 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 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 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 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 large aggregate fraction 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 Eksmal 4, it is recommended to install steel reinforcement mesh anchored to the concrete base. Additionally, grouted surface needs to be divided with construction joints in sections (with surface approximately 1-2 m²). Furthermore, joints can be filled with epoxy-based sealant (for obtaining flat monolith surface) or with elastic sealant (that allows unrestrained dilatation during exploitation).

CONSUMPTION

2200 kg Eksmal 4 are used for preparation of 1m³.

CLEANING

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


PACKAGING

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	
ADING AD Skopje Novoselski pat (street 1409)No.11, 1060 Skopje, Republic of North Macedonia 11 GBCB001/7 EN 1504-3:2005 EKSMAL 4 Concrete repair product for structural repair CC mortar (based on hydraulic cement)	
Compressive strength:	Class R4
Chloride ion content:	≤ 0.05%
Adhesive bond:	≥ 2.0MPa
Carbonation resistance:	Passes
Elastic modulus:	≥ 20 GPa
Thermal compatibility, part 1:	≥ 2.0 MPa
Capillary absorption:	≤ 0,5 kg*m⁻²*h^{-0.5}
Reaction to fire:	Euroclass A1

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.