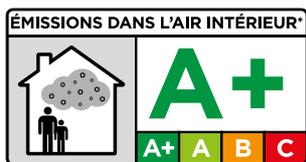




# BENFERCURE-VARIO-40

Rapid setting and rapid hardening mortars for reparation of concrete degraded structures, for protection against corrosion of reinforcing steel, for concrete superficial protection

- Cement based mortars classified R4, rapid setting and rapid hardening, for reparation of horizontal, vertical and overhead concrete structures
- Water impermeable, it prevents reinforcing steel corrosion
- Impede the passage of CO<sub>2</sub>
- Cure with low shrinkage and without cracks even under dynamic load
- Resistant to frost and de-icing salts
- For voids from 2 to 40 mm depth, maximum grain size: 0,5 mm
- Thanks to rapid setting and rapid hardening allows to make small jobs in one day
- Easy to smooth with float or sponge • Can be sprayed onto the surface
- Water vapor permeable • Very low VOC emission • Recyclable as aggregate
- Contains regional aggregates
- CE



## TECHNICAL FEATURES:

BENFERCURE-VARIO-40 is a cementitious thixotropic mortar for the protection against corrosion of reinforcing steel, for concrete superficial protection conforming to:

**EN 1504-3 CLASS R4, repair and structural recovery of concrete**

**EN 1504-2 protection of concrete**

**EN 1504-7 protection against corrosion of steel reinforcement of concrete.**

**CONTRACT ITEM SPECIFICATIONS:** Passivation, structural recovery of concrete elements and fast protection levelling with low thickness, through manual application or with machine, of cementitious and thixotropic mortar, rapid setting (10 minutes), specific for long lasting guaranteed concrete structures, as BENFERCURE-VARIO-40 by Benfer, complete of CE mark and conforming to performance requirements by norm EN 1504-7 for the protection against corrosion of reinforcing steel in concrete, and by norm EN 1504-3, class R4, for repair and structural recovery of concrete and by norm EN 1504-2 for protection of surfaces.



TECHNICAL ASSISTANCE



INSURANCE GUARANTEE



TECHNICAL MEETINGS



PROFESSIONAL USE

### AREAS OF APPLICATION:

BENFECURE-VARIO-40 is a thixotropic mortar used for renovation of horizontal, vertical and overhead concrete surface profiles in thickness up to 10 mm and for reparation of concrete structures under dynamic load (under roadways, concrete rails). Suitable for reparation of pillars, of defects like gravel pockets, ramps and industrial floors.

Thanks to its properties it allows fast and easy operation because it is not necessary a corrosion inhibitor application to reinforcing steel, there is no need for an additional smoothing mortar and can be finished with a breathable paint after 3 hours only.

### METHOD OF USE:

#### SUBSTRATE PREPARATION:

Before application of BENFERCURE-VARIO-40 exposed steel reinforcement must sand blast or brushed with care until every sign of mortar, debris and corrosion is completely eliminated.

Cementitious surfaces must be solid with a good key and be load-bearing, free from cement laitance, loose particles as well as adhesion inhibiting substances (oil, grease, rubber marks, paint residues or other contamination).

Surface preparation is necessary such as e.g. grit blasting, shot blasting, high pressure jet washing (500–2000 bar), scabbling or planning.

The substrate is to be thoroughly pre-wetted but during application the relevant substrate may however only be matt damp. Average surface tensile strength: min. 1.5 N/mm<sup>2</sup>.

**In case of renovation of large areas, a steel reinforcement fixed mechanically to the structure is mandatory.**



### **PRODUCT PREPARATION:**

25 Kg BENFERCURE-VARIO-40 with 4,50 – 5,00 liters water

Fill a mixing vessel with the above mentioned water quantity. Add the BENFERCURE-VARIO-40 under constant mixing with a suitable stirrer (approx. 300 rpm). Mix thoroughly for approx. 2-3 minutes to a lump free mortar. Use a compulsory mixer for preparing large quantities. Only mix as much material as can be used within the stated working life.

### **PRODUCT APPLICATION:**

**Application tools:** Hand trowel, wood float, steel trowel, hand tools for smoothing, rubbing board.

### **APPLICATION BY HAND:**

BENFERCURE-VARIO-40 can be applied manually onto the prepared substrate with steel trowel in a thickness of minimum 2 mm and maximum 40 mm.

On little areas it is possible to apply higher thickness in two operation within 1-2 hours.

Spread BENFERCURE-VARIO-40 to the required thickness with a suitable tool.

Finish by compacting the mortar and smoothening using a suitable tool.

### **FULL SERVICE:**

The pot life of dough is: 90 minutes at +5°C, 40 minutes at +20°C, 30 minutes at + 30°C.

### **Hardening and protection:**

Protect the surface during, at least, 24 hours after the application of BENFERCURE-VARIO-40, by using an appropriate expedient (for example covering up with a polyethylene sheet) against rapid drying caused by direct sunlight, by air flows and/or high temperatures.

The product can be finished with a transpiring after only 3 hours from application.

The final hardening will be complete after 28 days.

### **ADVICE:**

- Protect areas not to be treated from the effects of BENFERCURE-VARIO-40.
- Cover with suitable sheeting to protect against rain.
- Building substrates and ambient temperatures below +20°C delay setting times and above +20°C accelerate setting times.
- Use only mains or drinking water when mixing BENFERCURE-VARIO-40.
- Use only mains or drinking water when mixing BENFERCURE-VARIO-40. Do not add additional water or powder to material which has begun to stiffen in an attempt to restore original consistency. This can result in inadequate bonding.
- Applications that are not clearly explained in this technical data sheet may only be carried out after consultation with and written confirmation from our Technical Services.
- BENFERCURE-VARIO-40 contains cement that forms an alkaline reaction with moisture. Therefore contact with the eyes and skin is to be avoided and mortar splashes are to be immediately and thoroughly washed off with plenty of water. Seek medical attention from an eye specialist when contact with eyes occurs. Store BENFERCURE-VARIO-40 out of the reach of children.

## Product performance

Performance feature	Test method	Requirements EN 1504-2	Performance BENFERCURE-VARIO-40
Abrasion resistance	EN ISO 5470-1	≤ 3000 mg	Value exceeded
Water vapour impermeability	EN ISO 7783 -1 and -2	Class reference	Class I
Capillary absorption and water permeability	EN 16062-3	< 0,1 Kg*m <sup>2</sup> *h <sup>0,5</sup>	< 0,1 Kg*m <sup>2</sup> *h <sup>0,5</sup>
Impact resistance	EN ISO 6272-1	Class reference	Class III ≥ 20 Nm
Bond strength by pull-off	EN 1542	≥ 0,8 MPa	≥ 2,0 MPa
Bond strength after thermal shock	EN 13687-2	≥ 2,0 MPa	≥ 2,0 MPa
Linear shrinkage	EN 12671-1	≤ 0,3%	≤ 0,3%
Thermal expansion coefficient	EN 1770	α <sub>t</sub> <30*10 <sup>-6</sup> K <sup>-1</sup>	α <sub>t</sub> <30*10 <sup>-6</sup> K <sup>-1</sup>

Performance feature	Test method	Requirements EN 1504-3 R4	Performance BENFERCURE-VARIO-40
Compressive strength	EN 12190	after 24 hours after 7 days after 28 days ≥ 45 MPa	30 MPa 40 MPa 50 MPa
Tensile and flexural strength	EN 196/1	after 24 hours after 7 days after 28 days	6 MPa 9 MPa 12 MPa
Chloride ion content	EN 1015-17	≤ 0,05%	≤ 0,05%
Bond strength by pull-off	EN 1542	≥ 2,0 MPa	≥ 2,0 MPa
Carbonation resistance	EN 13295	Depth of carbonation ≤ to the reference	Value exceeded
Modulus of elasticity in compression	EN 13412	≥ 20 GPa	≥ 20 GPa
Thermal compatibility to freeze/thaw cycle with de-icing salts	EN 13687-1	Adherence after 50 cycles ≥ 2,0 MPa	≥ 2,0 MPa
Capillary absorption	EN 13057	< 0,5 Kg*m <sup>-2</sup> *h <sup>0,5</sup>	< 0,5 Kg*m <sup>-2</sup> *h <sup>0,5</sup>

Performance feature	Test method	Requirements EN 1504-7	Performance BENFERCURE-VARIO-40
Protection against corrosion	EN 15183	No corrosion	No corrosion
Bond by cutting	EN 15184	≥ 80% of the bare bar	≥ 80% of the bare bar

Please observe a valid EU safety data sheet.

**CLEANING:** The cleaning of the product must be done with a felt or a damp sponge, before the mortar starts setting.

**CONSUMPTION :** approx. 1,70 kg/m<sup>2</sup>/mm thickness  
approximately 1 liter of dough= 2,04 kg

**PACKAGING:** 25 kg bags.

**STORAGE:** In the original unopened packaging

**SHELF LIFE:** 12 months.

**PRODUCT TECHNICAL DATA**

Basis:	Grey powder
Colour:	Grey
Storage and duration:	12 months in the original unopened packaging;
Danger of harm:	They may cause irritation to skin and eyes due to presence of cement
Flammability:	No
Apparent mass volume:	1,34 kg/dm <sup>3</sup>
maximum grain size:	0,5 mm
Mix ratio:	Approx. 4,5 - 5,0 liters of water per 25 kg bag (18-20%)
Mixing time:	2-3 min (drilling machine min. 300 - 500 r/min)
Mixture consistency:	Thixotropic mortar
Mass volume:	2,04 kg/dm <sup>3</sup>
pH:	12
Application temperature:	From + 5°C to + 35°C
Spreading:	140-160 mm
Resistance to temperature:	From -30°C to + 90°C
Pot Life:	BENFERCURE-VARIO-10 approx. 10 minutes* at +20°C BENFERCURE-VARIO-40 approx. 40 minutes* at +20°C
Max.min. thickness:	From 2 to 40 mm
Final hardening:	28 days

Compression strength after 24 hours, 7 and 28 days:	30 N/mm <sup>2</sup> , 40 N/mm <sup>2</sup> , 50 N/mm <sup>2</sup>
Flexural strength after 24 hours, 7 and 28 days:	6 N/mm <sup>2</sup> , 9 N/mm <sup>2</sup> , 12 N/mm <sup>2</sup>
Chloride ions content (EN1015-17):	≤ 0,05%
Binding of adhesion (EN1542):	≥ 2,0 MPa
Shrinkage and expansion (EN12617-4):	≥ 2,0 MPa
Capillary absorption (EN13057):	≤ 0,5 %
Thermal compatibility part 1 (EN13687-1) freeze-thaw:	≥ 2,0 MPa
Thermal compatibility part 2 (EN13687-2) storm:	≥ 2,0 MPa
Thermal compatibility part 4 (EN13687-4) dry cycles:	≥ 2,0 MPa
*at 23°C and 50% of relative humidity	

**PLEASE NOTE:** The information given in this chart is based on our best experience and indicative only. It must in any event be verified by the end user, who assumes all liabilities deriving from utilization of the product.