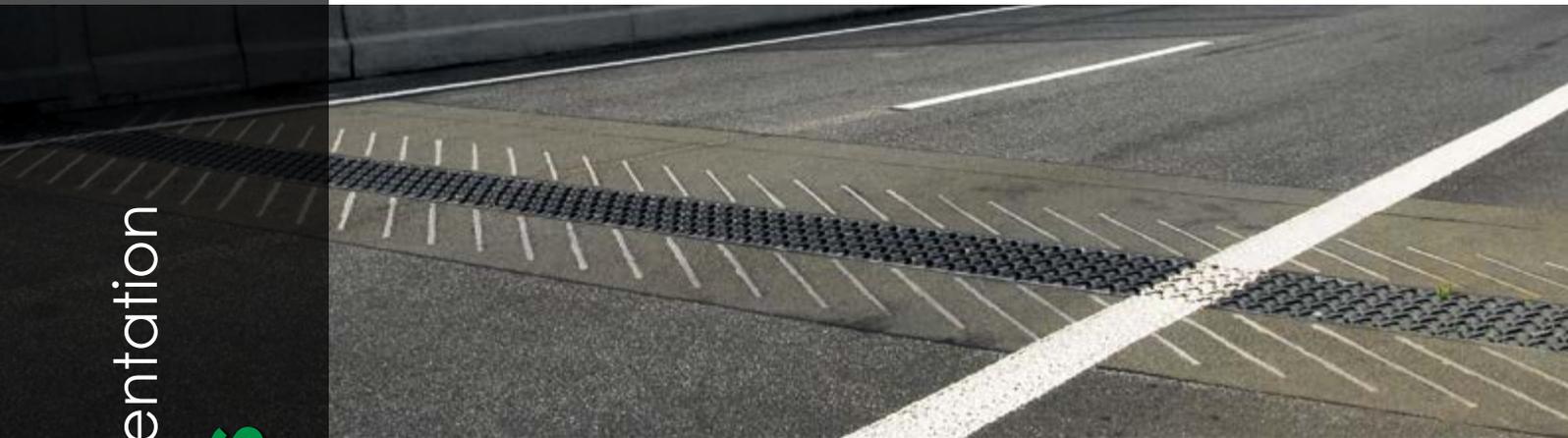


Reactive resin mortar for very strong, quick repairs in concrete and engineering works, also for mortar toppings for bridge bearings



Expect more from your floor.



Silikal Technical Documentation
Mortar systems



Silikal's production and administrative headquarters in Mainhausen/Germany, near Frankfurt am Main

... as we have been for more than 60 years

We've been doing the basics for you for decades: with a background in screed construction, we decided more than 60 years ago to concentrate on the development and manufacture of floor coatings based on synthetic resins. Our history since then has seen countless research and development projects. Silikal is now active across the world and is represented in Germany and Europe as well as Asia and Australia.

... whatever your problems

Whether it's a new construction, repairs or renovation: our methacrylate resins are tried and tested heavy-duty floor coatings for industry, commerce and crafts, on transport surfaces, in public institutions and in medical facilities. Silikal's repair mortar systems are also used as reliable problem-solvers: to ensure the rapid improvement of holes, cracks or ruptures in concrete, prefabricated concrete or screeding, underline bridge bearings, establish machine foundations or fix heavy-duty sections and components in position.

... with the right systems

We have the right answer for your flooring problem. Super-fast curing with no disruption to operations, the exact degree of slip resistance required, processing even at very low temperatures, a large selection of colour design options and much, much more – all thanks to Silikal's product range.

... and with professional staff

Need advice? Delighted – put us to the test! Every project has its own demands and requirements. Our staff come from the industry. They are familiar with the problems on site and boast worldwide experience as applications engineers. That's why you should talk to us. We'll be happy to help when it comes to realising even the most difficult flooring projects or the possible uses of rapid-curing mortar systems.

And if you'd really like to get into the details, Silikal's training centre in Mainhausen can provide you with a comprehensive range of practically-oriented information.

One thing you can be sure of: we're always here for you!



Certified Quality and Ecology
Management Systems
Reg. No. 73 100 / 104 663



Certified according to
AgBB evaluation scheme



Our products are certified
by HACCP international



Our products comply
with the Halal european guidelines



Silikal product information

Version R 17 – 3.00.A

August 2016

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Silikal product information		Data sheet – Page
Mortar Systems Technical Documentation - Introduction		4
SILIKAL® R 17 mortar areas of application	Road construction and repairs	6
SILIKAL® R 17 mortar areas of application	Bridge bearings	9
SILIKAL® R 17 mortar areas of application	Industrial facilities	10
SILIKAL® R 17 mortar areas of application	Airports	12
SILIKAL® R 17 mortar areas of application	Rail construction	13

Silikal product information		Data sheet – Page	
SILIKAL® R 17 mortar	Reactive resin mortar for concrete repairs and screeds	SILIKAL® R 17	14
SILIKAL® R 7 mortar	Hard reactive resin mortar for floorings	SILIKAL® R 7	17
SILIKAL® R 16 mortar	Reactive resin mortar for quick concrete repair	SILIKAL® R 16	19
SILIKAL® R 52 resin	Reactive, medium-viscosity primer for cement substrates	SILIKAL® R 52	21
SILIKAL® RI/21	Tensile bond adhesive	SILIKAL® RI/21	23
SILIKAL® R 90 Adhesive	2-component MMA-adhesive for the building industry and road construction	SILIKAL® R 90	24

Silikal product information		Data sheet – Page
Summary of Specifications		26



Important Note

The following extremely important and partially complementary data sheets or chapters are included in the technical documentation:

- Data sheet SILIKAL® Hardening Powder
- Data sheet SILIKAL® Additive ZA, low-temperature accelerator for priming
- Special priming data sheet SILIKAL® R 51 resin (low viscosity) and SILIKAL® RU 727 resin (adherent priming)
- General processing information
- The substrate
- Information on safety and protection

Silikal reactive resins enable surfaces that combine high strength with decorative qualities to be applied in almost all industrial and traffic sectors, as well as permitting the preparation of mortar systems for the quick repair of concrete. Silikal is a well known company specialising in the methacrylate reactive resin sector. Its suitability has been demonstrated on millions of square metres over the last 60 years.

Silikal R 17 Mortar Systems ...

are different from other mortars and sealing mortars in their rapid setting time, which means the repaired surface can be used approximately one hour after completing the work. This is due to the unique qualities of the binder used: Silikal methacrylate-based reactive resins, which set quickly with little relation to temperature. No other reactive resin mortar (e.g. epoxy resin-based mortars) comes even close to matching the two major qualities of Silikal reactive resin mortars.

Reactive Resins (PMMA) from Silikal ...

... have other significant advantages over other commercial resins, such as epoxy or polyurethane:

- **Fast setting time** of reactive resins, restoring the floor to full strength in a short space of time.
- Setting even at **low temperatures** (in certain conditions, as low as -10 °C or -25 °C), which means they can be applied without difficulty even in winter or in cold chambers.
- **Excellent adherence** to the base and easy to restore.
- **The hardened mortar** is physiologically harmless

Silikal R 17 Reactive Resin for Work on Concrete and Quick Repairs

Everyone knows that concrete is repaired with mineral mortars. Normally cement is used as the binder for the sand and other additives, while the mixture is set with water. If required, additives are added to improve specific qualities in the concrete.

Although cement mortars may be applied to moist bases,

- they need temperatures above 0° C to set
- they require long setting times
- and they have limited flexibility and little resistance to wear and aggressive environments.

Surprisingly, most people do not know that concrete can also be repaired using mortars whose mineral additives use synthetic resins and not cement as a binder. They probably think that reactive resins do not have the same properties as concrete, especially in terms of compressive strength. However, the opposite is true in fact, as the strength and general properties of mortars with reactive resin binders are, in certain cases, higher than concrete itself. Naturally, the cost is not the same, so reactive resins are not applied to large surface areas but are mainly used for repair work. Even so, considering the working time saved and the quick recovery of the properties of the floor, the overall cost of repair work is usually lower in such cases.

As previously mentioned, the binder in Silikal mortar is the reactive resin “methacrylate” and certain other major reagents, and use sand with a special grain size as aggregate. This mortar, with such extraordinary properties, was invented by Silikal over 45 years ago and is still a unique and unbeatable product when it comes to repairing concrete surfaces or parts, especially under difficult conditions. Currently, no other comparable mortars have such a short setting time - even at low temperature - or such excellent properties in comparison with mineral mortars.

The Silikal R 17 mortar system consists of the filler, presented in 15-kg bags, and the corresponding hardening liquid in 2-litre cans. Once both components have been mixed, a pourable mass is produced for coating the area under repair. For repairing vertical or inclined surfaces, we have developed the Silikal R 17 “thixotropic” mortar system. Naturally, (as with all other repair materials), the base needs to be properly prepared to obtain high-quality repairs. Optimum adherence requires priming with a product such as SILIKAL® R 52 resin or R 51 resin. A single packing unit of SILIKAL® R 17 mortar can be used to repair a surface of approx. 1 m² with a layer approx. 1 cm thick.

Silikal R 17 reactive resin mortar is also available in a number of special preparations:

- “fine” for repairing thin surfaces, with a 2 to 6 mm layer
- “-25” for extremely low temperatures (as low as -25 °C) e.g. in deep freezers
- “R 16” for application without priming in simple repair work.
- „R 17 ABZ” resin based reactive mortar with “General Technical Approval” by the German Institute for building products DIBt (reaktionsharzgebundener Vergussmörtel mit allgemeiner bauaufsichtlicher Zulassung Z-3.82-2044).

The standard colour of Silikal R 17 reactive mortar is “concrete grey”, but other colours are available of minimum order size. Silikal R 17 reactive resin mortar can be used even for layers of thickness > 25 mm by incorporating medium- or large-grain aggregate (gravel). Surfaces made using Silikal R 17 reactive resin mortar enable flooring to be laid at a later stage to provide different decorative effects. Silikal R 17 reactive resin mortar has been tested and certified for a number of different applications.

Summary of main characteristics:

- **Fast setting (approx. 1 hour)**
- **Usable at low temperatures as low as -10 °C (special grade -25 °C)**
- Easy to handle
- Harder than concrete itself
- Impermeable to liquids
- More resistant to chemical agents
- Totally weather-resistant
- Excellent wear-resistance
- Hot-water resistant
- No shrinkage
- Resistant to de-icing salt and frost
- High electrical insulating properties

Main applications of Silikal R 17 reactive resin mortar:

- Repairing floors without long-term interruptions to service
- Furring of train tracks and rails
- Building of traffic islands
- Kerb stone repair
- Surface covering for extreme load conditions
- Repairing bridge pillars
- Bridge bearings for rail and road pillars
- Repairing pedestrian walkways
- Repairing stairs and platform edges
- Ramps and levelling work in bridges and buildings
- Fixing metal components and beams
- Foundations for machinery and steel structures
- Repairing joints and edges
- Filling in potholes
- Precast polymer concrete parts

In general, the indications given in the current version of the general technical documentation as well as this “Mortar Systems” technical documentation should be observed.

Updating service

The latest versions of this technical documentation and the general technical documentation are available from the Silikal web site at “www.silikal.de”.

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SILIKAL® R 17 mortar areas of application

Road construction and traffic areas



A2 Motorway, Hamm-Uentrop/Germany:
Construction of transverse drainage channels



Car park "Altlohrtor", Koblenz/Germany:
Renovation of ramps



A11 Motorway/Germany:
Bridge cap and walk way renovation



A45 Motorway near Solms/Germany:
Repair and implantation of joint profiles



A4 Motorway near Düren/Weisweiler/Germany:
Concrete slab edge repair

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SILIKAL® R 17 mortar areas of application

Road construction and traffic areas



K 106 by-road, Neuwied-Niederbieber/Germany:
Kerb of a traffic island stuck to the asphalt with SILIKAL® R 17 mortar



Repairing the kerbs with SILIKAL® R 17 mortar



Metro station stairs in Venloer street, Cologne/Germany: Repairing the steps



Car park airport, Stuttgart/Germany:
Kerb stone stuck to concrete with SILIKAL® R 17-thix mortar



South bus station of the "Franz-Josef Strauss" airport, Munich/Germany:
Repairing drainage channels

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SILIKAL® R 17 mortar areas of application

Road construction and traffic areas



A38 Motorway near Breitenworbis/Germany: Joint rip profile installation



B42 Interstate Road/Germany:
Underlayment of steel construction



Wied-Bridge, Waldbreitbach/Germany:
Surface coating of an aluminium pedestrian bridge



River Rhine Bridge near Wesel/Germany:
Underlayment of hand rail columns

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SILIKAL® R 17 mortar areas of application

Bridge bearings



New railway bridge construction in Hannover-Ohedamm/Germany:
Bridge bearings



A6 Motorway Bridge, Massholdertal/Germany:
New bridge bearings



Metropolitan viaduct, Berlin/Germany, Sterndamm:
repairing bridge bearings



New railway bridge construction in Grafenwöhr/Germany:
Bridge bearings

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SILIKAL® R 17 mortar areas of application

Industrial facilities



CORUS aluminium rolling mill,
Koblenz/Germany:
Repairing traffic areas



Top:
MHP Mannesmann
Präzisionsrohr GmbH, Hamm/Germany:
Repairing pot holes



Left:
Fahrzeugwerke Faymonville AG, Billigen/Belgium:
Repairing expansion joints



Forwarder warehouse, Kassel/
Germany:
Renovation of a loading ramp

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SILIKAL® R 17 mortar areas of application

Industrial facilities



Metro AG, Essen/Germany:
Renovation of expansion joints
in a warehouse



May Werke GmbH & Co. KG,
Erfstadt-Köttingen/Germany:
Renovation of expansion joints



Crack grouting /
renovation of
floor areas



Figure on top:
Deutsche See GmbH & Co. KG,
Bremerhaven/Germany:
Repair of floor areas in cold store
house with SILIKAL® R 17 mortar
with no disruption to operation
(-25 °C)

Left:
Rheingas AG, Brühl/Germany:
Repairing sliding gate

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SILIKAL® R 17 mortar areas of application

Airports



Mannheim Airport/Germany:
Repairing hangar floors



Leipzig/Halle Airport/Germany:
Repairing concrete, runways and taxiways



Top, left:
Leipzig/Halle Airport/Germany:
Repairing concrete, runways and taxiways



Mannheim Airport/Germany:
Laying foundations of sliding door rails



Nordrhein-Westfalen Airport/Germany:
Replacing and installing embedded runway lights without air-traffic interruption



Nordrhein-Westfalen Airport/
Germany:
Sealing cable ducts with asphalt-
coloured SILIKAL® R 17 mortar

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SILIKAL® R 17 mortar areas of application

Rail construction



Railway track Düsseldorf-Wuppertal/Germany:
Installation of steel columns



Railway track Koblenz-Bonn/Germany:
Underlayment of steel columns for noise protection



Deutsche Bahn AG,
Braunschweig railyard/Germany:
Renovation of track storage

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Silikal product information

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SILIKAL® R 17 mortar is a solvent-free 2-component methacrylic resin mortar with a high compressive strength and tensile strength in bending. It is characterized by very low linear shrinkage.

Because of its high strength, the mortar is suitable as a wear-resistant concrete coating for coating thickness of 6 – 20 mm. The low shrinkage rate enables even larger unevenness to be levelled out. The mortar surface resembles that of a fine exposed concrete and can be topped with suitable Silikal coatings to ensure a decorative surface look. The hardening time is about 1 hour at +20 °C, and hardening takes place in temperatures ranging from -10 °C to +35 °C (approx. 1 – 3 hours). The very low viscosity enables rapid mixability and application to be achieved.

Application

Special areas of use are on floors for traffic areas in industrial concerns which are subject to heavy mechanical stress and as a localized repair mortar for indoors and outdoors. Greater coat thicknesses can be achieved by adding further coarse aggregates (e. g. for ramps, rail bedding, filler and screed mortars, casting bridge bearings). Suitable coarse aggregates include non-absorbent mineral particles (e. g. quartz gravel) in the proportions listed in the table below. For large-volume applications, individual gravel stones up to 30 cm in diameter can be inserted. However, these should not touch each other, as otherwise this place will have an increased tendency to fracture.

Advice on application

The substrate generally needs to be pre-treated.

👁 Please refer to the technical information sheet entitled **“The Substrate”**.

SILIKAL® R 17 mortar consists of SILIKAL® R 17 Powder to which quartz sand of particle diameter up to 1.8 mm has been added and the watery methacrylic-based SILIKAL® R 17 Hardener Liquid.

The consumption of basic mortar mix is 2 kg/m² per mm of coat thickness. The recommended primer for cement substrates is SILIKAL® R 51 resin with quartz sand of particle size 0.7 – 1.2 mm loosely sprinkled in.

The mixing ratio is 15 kg (1 sack) of SILIKAL® R 17 Powder and 1.7 – 2.2 litres of SILIKAL® R 17 Hardener Liquid. You must not use more or less than these quantities of hardener liquid, as they already cover the range from stiff to low viscous.

Under no circumstances should other untested additives be added to the mixture. The exact coating thickness of 6 mm must be observed. On unevenness which runs out to zero, cuts must be made in the edge area. Thinner coats will result in reduced strength and hardening problems.

Mixing the reactive resin mortar

To produce the mortar mix, 1.7 – 2.2 litres of SILIKAL® R 17 Hardener Liquid (depending on the desired mortar consistency) is added to the SILIKAL® R 17 Powder. Because of its thin, viscous consistency, the mix can be easily prepared in a short time by means of a high-speed agitator, while smaller quantities can be prepared manually. Mixes with coarse aggregates can also be produced using low-speed forced agitators or in the normal concrete mixer. You must ensure that the coarse particles are not added until the SILIKAL® R 17 Powder and SILIKAL® R 17 Hardener Liquid have already been mixed together.

The finished mortar is spread evenly by means of a doctor blade and smoothed or applied using an aluminium lath and screed board. The boards should normally be made from polypropylene strips (PP), as these can be easily detached from the mortar after hardening and then cleaned.

The pot life at normal temperatures is about 12 – 14 minutes, the hardening time about 60 – 90 minutes. The values indicated will vary according to the ambient temperature.

If mortar surfaces made from SILIKAL® R 17 mortar are then coated with reactive methacrylic resin systems, another coat of primer (e. g. SILIKAL® R 51 or RU 727 resin) must be applied first.

Special formulations:

SILIKAL® R 17-fine mortar

If the basic mortar mix is too coarse for finer concrete work, we recommend that you use SILIKAL® R 17-fine powder instead (minimum thickness of SILIKAL® R 17-fine mortar: 2 mm). In this case, the necessary quantity of SILIKAL® R 17 Hardener Liquid is about 2.7 – 3.0 litres per 15 kg of fine powder.

SILIKAL® R 17 (-25 °C) mortar

For repair work in cold areas (cold stores, winter season), you can use this more accelerated SILIKAL® R 17 mortar. However, this should only be applied at temperatures ranging from -10 °C to -25 °C and must be cooled down to at least 0 °C before being applied. The special formulation relates to hardener liquid and powder.

SILIKAL® R 17-thix mortar

If laying on inclines or when modelling edge excavations and coving, we recommend that you use SILIKAL® R 17-Thix Hardener Liquid, but at the same mixing ratio, due to the thixotropic formulation.

SILIKAL® R 17 ABZ mortar, General Technical Approval Z-3.82-2044

Valid for the application of the factory-mixed casting mortar in layer thickness of 20 – 100 mm and footprint of max. 100 x 100 cm, preferable for castings of bridge bearings and rail seats (ref. Product Data Sheet SILIKAL® R 17 ABZ mortar).

Special shades/colours

The standard shade is roughly RAL 7030 medium grey. If complete batches and minimum quantities are purchased, special shades are available on request.

Characteristics of R 17 Hardener Liquid as delivered

Property	Measuring method	Approx. value
Viscosity at +20 °C	DIN 53 015	0.6 – 0.7 mPa · s
Flow time at +20 °C, 3 mm cup	ISO 2431	20 – 21 sec.
Density D_4^{20}	DIN 51 757	0.93 g/cm ³
Flash point	DIN 51 755	+10 °C
Pot life at +20 °C		approx. 15 min.
Application temperature		-10 °C to +35 °C

Characteristics of R 17 mortar in the hardened state

Property	Measuring method	Approx. value
Density	DIN 53 479	2.15 g/cm ³
Compressive strength	DIN 1164	75.0 N/mm ²
Tensile strength in bending	DIN 1164	27.5 N/mm ²
Module of elasticity	DIN 53 457	7000 N/mm ²
Water absorption, 4 days	DIN 53 495	90 mg (50 · 50 · 4 mm)
Water vapour permeability	DIN 53 122	1.05 · 10 ⁻¹¹ g/cm · h · Pa

Calculation aid for application and costing

SILIKAL® R 17 mortar	Quantity in kg	Loose (litres)	Solid volume (litres)	Minimum thickness (mm)
a) R 17 Powder R 17 Hardener Liquid	15.00 1.85 <u>16.85</u>	11.50 2.00	8.50	6
b) R 17 Powder R 17 Hardener Liquid SILIKAL® Filler QS 2 – 8 mm	15.00 1.85 8.00 <u>24.85</u>	11.50 2.00 5.00	11.60	25
c) R 17 Powder R 17 Hardener Liquid SILIKAL® Filler QS 2 – 8 mm SILIKAL® Filler QS 8 – 16 mm	15.00 1.85 3.00 12.00 <u>31.85</u>	11.50 2.00 1.90 7.50	14.25	50

Characteristics of R 17 ABZ Hardener Liquid as delivered

Property	Measuring method	Approx. value
Viscosity at +20 °C	DIN 53 015	0.6 – 0.7 mPa · s
Flow time at +20 °C, 3 mm cup	ISO 2431	20 – 21 sec.
Density D_4^{20}	DIN 51 757	0.930 – 0.931 g/cm ³
Volatile organic compounds VOC	DIN EN 3251:2008	1.85 %
Flash point	DIN 51 755	+10 °C
Pot life at +20 °C		approx. 15 min.
Application temperature		-10 °C to +30 °C

Characteristics of R 17 ABZ mortar in the hardened state

Property	Measuring method	Approx. value
Temperature development, exotherm*	DIN EN ISO 9514:2005	+ 62 °C (at +21 to +30 °C)
Linear shrinkage*	SIBR:2001 Part 4, 4.4.9	0.4 mm/m
Density	DIN 53 479	2.15 g/cm ³
Compressive strength (after 24 h at +21 °C)*	DIN EN 196-1:2005	80.0 N/mm ²
Compressive strength (after 24 h at -10 °C)*	DIN EN 196-1:2005	75.0 N/mm ²
Bending tensile strength (after 24 h at +21 °C)*	DIN EN 196-1:2005	17 N/mm ²
Bending tensile strength (after 24 h at -10 °C)*	DIN EN 196-1:2005	17 N/mm ²
E-Modulus of elasticity (aged after 7 d)*	DIN EN 13412:2006	13 800 N/mm ²
E-Modulus of elasticity (after 24 h at +50 °C)*	DIN EN 13412:2006	4 300 N/mm ²
Water absorption after 4 days	DIN 53 495	< 1 %
Water vapour permeability	DIN 53 122	1.05 · 10 ⁻¹¹ g/cm · h · Pa

*according to IBAC Test Certificate M1291/2

Calculation aid for application and costing

SILIKAL® R 17 ABZ mortar	Quantity in kg	Loose (litres)	Solid volume (litres)	Minimum thickness (mm)
R 17 Powder	18.00	13.50 (1 sack)		
R 17 Hardener Liquid	1.85	2.00 (1 canister)		
	<u>19.85</u>	<u>15.50</u>	9.00	20 – 100 mm

Other relevant documentation: Technical Documentation Data sheet

General processing information	AVH
The substrate	DUG
Fillers and pigments	FUP
Information on safety and protection	SUS
Storage and transport	LUT

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Version R 17 – 3.00.A

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Data sheet SILIKAL® R 17

Sheet 3 of 3

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SILIKAL® R 7 mortar

Hard reactive resin mortar for floorings



SILIKAL® R 7 mortar is a solvent-free 2-component methacrylic resin mortar with a very high compressive strength. It is used as a fillable, highly stress-resistant concrete coating in thickness of 4 – 6 mm.

Because of the enormously great strength, the concrete surface can be made resistant to heavy wear. The mortar surface has a similar appearance to that of a modified concrete grade. The hardening time is about 1 hour at +20 °C, and hardening takes place in temperatures ranging from -10 °C to +35 °C. The very low viscosity enables rapid mixability and application to be achieved.

Application

Preferred fields of use are floors for indoor areas in heavy industry which are subject to strong mechanical stresses.

SILIKAL® R 7 mortar should not be applied over large areas of deep-freeze rooms and outdoors. We recommend that you use impact-resistant types such as SILIKAL® RV 368 resin instead.

Advice on application

The substrate generally needs to be pre-treated.

👁 Please refer to the technical information entitled “**The Substrate**”.

SILIKAL® R 7 mortar consists of SILIKAL® R 7 Powder to which fillers of particle diameter up to 1.8 mm has been added and the watery methacrylic-based SILIKAL® R 7 Hardener Liquid.

The recommended primer for mineral substrates is SILIKAL® R 51 resin with loosely quartz sand of particle size 0.7 – 1.2 mm sprinkled in.

The mixing ratio is 15 kg (1 sack) of SILIKAL® R 7 Powder and 1.7 – 2.0 litres of SILIKAL® R 7 Hardener Liquid. You must not use more or less than these quantities, as they already cover the range from stiff to low viscosity.

Under no circumstances should other additives be added to the mixture. The exact coating thickness of 4 – 6 mm must be observed. Thinner coats will lead to a reduction in strength and hardening problems, while exceeding the maximum coating thickness can lead to cracks forming or shrinkage stress.

Mixing the reactive resin mortar

To produce the mortar mix, 1.7 – 2.0 litres of SILIKAL® R 7 Hardener Liquid (depending on the desired mortar consistency) is added to the SILIKAL® R 7 Powder. Because of its thin, viscous consistency, the mix can be easily prepared in a short time by means of a high-speed agitator, while smaller quantities can be prepared manually.

The finished mortar is spread evenly by means of a doctor blade and smoothed or applied using an aluminium lath and screed board. The boards should normally be made from polypropylene strips (PP), as these can be easily detached from the mortar after hardening and then cleaned.

The pot life at normal temperatures is about 12 – 14 minutes, the hardening time about 60 – 90 minutes. The values indicated will vary according to the ambient temperature.

Special formulations:

The standard shade is roughly RAL 7030 medium grey. If complete batches and minimum quantities are purchased, special colours are also available on request.

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Version R 17 – 3.00.A

August 2016

Data sheet SILIKAL® R 7

Sheet 1 of 2

Characteristics of R 7 Hardener Liquid as delivered

Property	Measuring method	Approx. value
Viscosity at +20 °C	DIN 53 015	0,6 – 0,7 mPa · s
Flow time at +20 °C, 3 mm cup	ISO 2431	20 – 21 sec.
Density D ₄ ²⁰	DIN 51 757	0.94 g/cm ³
Flash point	DIN 51 755	+10 °C
Pot life at +20 °C with R 7 Powder		approx. 15 min.
Application temperature with R 7 Powder		-10 °C to +35 °C

Characteristics of R 7 mortar in the hardened state

Property	Measuring method	Approx. value
Density	DIN 53 479	2.16 g/cm ³
Compressive strength	DIN 1164	105.0 N/mm ²
Tensile strength in bending	DIN 1164	37.5 N/mm ²
Modulus of elasticity	DIN 53 457	20300 N/mm ²
Water absorption, 4 days	DIN 53 495	90 mg (50 · 50 · 4 mm)
Water vapour permeability	DIN 53 122	1.6 · 10 ⁻⁸ g/cm · h · Pa

Calculation aid for application and costing

SILIKAL® R 7 mortar	Quantity in kg	Quantity in litres Loose	Quantity in litres Solid volume	Thickness (mm)
R 7 Powder	15.00	11.50		
R 7 Hardener Liquid	1.85	2.00		
	<u>16.85</u>		8.50	5

Other relevant documentation: Technical Documentation Data sheet

General processing information	AVH
The substrate	DUG
Information on safety and protection	SUS
Storage and transport	LUT

Silikal product information

Version R 17 – 3.00.A

August 2016

Data sheet SILIKAL® R 7

Sheet 2 of 2

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SILIKAL® R 16 mortar is a solvent-free quick-hardening 2-component methacrylate resin mortar that provides mid-range compressive and flexural strength. It has a very low degree of linear shrinkage. No priming is required.

Because of its strength, this mortar is suitable for repairing damaged concrete when applied in layers with a minimum thickness of 6 mm. Its low tendency to shrinkage means it can be used to fill holes. In this case, medium-coarse aggregate must be added (quartz gravel). The mortar has a surface appearance similar to fine-grain facing concrete. Its hardening time is approx. 1 hour at +20 °C; the process requires a temperature of between -10 °C and +35 °C (approx. 1 – 3 hours). Its low viscosity means the mixture can be prepared and applied quickly.

Application

It is particularly suitable for concrete surfaces or cement floors subject to normal forces. If formwork (moulds) is required, wooden boards with coating (e.g. melamine) should be used. SILIKAL® R 16 mortar is also suitable to fix kerb bricks onto outdoor asphalt and concrete pavements.

Preparation Instructions

Normally, the substrate should be prepared beforehand (it must be dry, free of dust and grease, and sufficiently strong).

👁 For more information, consult the technical documentation, sheet **“The substrate”**. Concrete priming need not be applied.

SILIKAL® R 16 Powder is used as mortar. The second component is methacrylate-based hardening liquid, SILIKAL® R 16 Hardener Liquid.

The consumption of basic mortar mix is 2.2 kg/m² per mm of layer thickness. The mixing-ratio is 15 kg (1 bag) of SILIKAL® R 16 Powder to approx. 2.1 – 2.5 litres of SILIKAL® R 16 Hardener Liquid. The amount of hardener must be measured accurately, as the specified proportions provide properties ranging from stiff to low viscous. The mixture must never include other different components. The thickness of the layer should at no point be less than 6 mm. On unevenness which runs out to zero, cuts must be made in the edge area. Lower thickness leads to a decrease in strength and hardening problems.

Preparing Reactive Resin Mortar

To prepare the mortar, add between 2.1 and 2.5 l of SILIKAL® R 16 Hardener Liquid to SILIKAL® R 16 Powder, depending on the required consistency.

A liquid consistency permits a quicker preparation time using a high-speed agitator; lower amounts can be prepared with manual procedures. Once the mortar has been prepared, spread it evenly and smooth it down with a trowel or doctor blade, finally going over the surface with an aluminium lath and screed board. Use polypropylene (PP) strips as boards, as these are easy to be removed and cleaned from the set mortar.

Pot-life at normal temperatures is 12 – 14 minutes, and hardening time 60 – 90 minutes. These times may vary with air temperature.

Intermediate priming (e.g. with SILIKAL® R 51 resin or SILIKAL® RU 727 resin) is required, if methacrylate reactive resin coating is to be applied to the surface treated with SILIKAL® R 16 mortar.

Special Colours

The standard shade is roughly RAL 7030 medium grey. If complete batches and minimum quantities are purchased, special colours are available on request.

Characteristics of the R 16 Hardener Liquid as supplied

Property	Measuring method	Approx. value
Viscosity at +20 °C	DIN 53 015	20 – 30 mPa · s
Flow time at +20 °C, ISO 4	ISO 2431	17 – 20 sec.
Density D_4^{20}	DIN 51 757	0.98 g/cm ³
Flash point	DIN 51 755	+10 °C
Pot-life at +20 °C with R 16 powder		approx. 15 min.
Application temperature with R 16 powder		-10 °C to +35 °C

Characteristics of R 16 mortar once hardened

Property	Measuring method	Approx. value
Apparent density	DIN 53 479	2.10 g/cm ³
Compressive strength	DIN 1164	32 N/mm ²
Flexural strength	DIN 1164	13 N/mm ²
Modulus of elasticity	DIN 53 457	2,300 N/mm ²
Water absorption, 4 days	DIN 53 495	90 mg (50 · 50 · 4 mm)
Water vapour permeability	DIN 53 122	1.05 · 10 ⁻¹¹ g/cm · h · Pa

Calculation aid for application and costing

SILIKAL® R 16 mortar	Quantity in kg	Quantity in litres Loose	Quantity in litres Solid volume	Thickness (mm)
R 16 powder	15.00	11.50		
R 16 hardener	2.30	2.30		
	<u>17.30</u>		8.30	6 – 25

Other relevant documentation: Technical Documentation Data sheet

General processing information	AVH
The substrate	DUG
Information on safety and protection	SUS
Storage and transport	LUT

Silikal product information

Version R 17 – 3.00.A

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Data sheet SILIKAL® R 16

Sheet 2 of 2

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SILIKAL® R 52 resin

Reactive, medium-viscosity primer for cement substrates



Expect more from your floor.

SILIKAL® R 52 resin is a medium-viscosity, transparent, solvent-free 2-component methacrylic resin that cures rapidly even at low temperatures if hardener is added. Its higher viscosity makes SILIKAL® R 52 resin more suitable than SILIKAL® R 51 resin for priming vertical and absorbent substrates with sufficient strength.

Application

SILIKAL® R 52 resin is used as an adherent primer on concrete and cement substrates. The higher viscosity means that a thicker and more integral priming film is achieved than with SILIKAL® R 51 resin.

Advice on application

Once the substrate has been inspected, it normally needs to be pre-treated.

The necessary quantity of hardener must be adjusted in light of the temperature of the building. For the exact quantities, please refer to the table “**Hardener dosages**”.

You must not dose less than the given quantity of hardening powder, as this will jeopardize the curing process. You must also avoid overdosing the hardening powder, as this can likewise lead to serious curing problems.

If the pot life, within which good penetration of the substrate is guaranteed, is to be observed, appropriate batch quantities should be estimated. The material must be applied as soon as the hardening powder has finished dissolving in the resin components.

SILIKAL® R 52 resin must be applied evenly without leaving puddles by means of a paint roller or brush. If rubber blades are used, the surface must always be rolled with a paint roller afterwards. Matt and heavily absorbent patches must be reprimed wet in wet before hardening until the pores are closed up. Resin consumption is about 0.4 kg/m².

SILIKAL® Filler QS 0.7 – 1.2 mm can be sprinkled loosely into the fresh primer coat.

SILIKAL® R 52 resin must be completely cured before any further coat is applied.

Guideline recipe and batch quantities

Item	Component	Guideline recipe (% by weight)	Comments	Batch for 10 litre bucket	
				10 kg	10 litres
1	SILIKAL® R 52 resin	100 %		10 kg	10 litres
	Total:	100 %	Average consumption: 400 g/m²	10 kg	10 litres
2	SILIKAL® Hardening Powder	2 – 6 % related to item 1	See “Hardener dosages” table for quantities	200 – 600 g	

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Version R 17 – 3.00.A

August 2016

Data sheet SILIKAL® R 52

Sheet 1 of 2

Characteristics of R 52 as delivered

Property	Measuring method	Approx. value
Viscosity at +20 °C	DIN 53 015	270 – 330 mPa · s
Flow time at +20 °C, 4 mm cup	DIN 53 211	47 – 53 sec.
Density D ₄ ²⁰	DIN 51 757	0.98 g/cm ³
Flash point	DIN 51 755	+10 °C
Pot life at +20 °C (100 g, 3 % pbw. hardening powder)		approx. 12 min.
Application temperature		+5 °C to +30 °C

Characteristics of R 52 in the hardened state

Property	Measuring method	Approx. value
Density	DIN 53 479	1.16 g/cm ³
Ultimate elongation	DIN 53 455	7 %
Shore-D	DIN 53 505	70 – 80 units
Water absorption, 4 days	DIN 53 495	125 mg (50 · 50 · 4 mm)
Water vapour permeability	DIN 53 122	1.05 · 10 ⁻¹¹ g/cm · h · Pa

Hardener dosages

Temperature	Hardening powder % pbw. *	Pot life approx. min.	Hardening time approx. min.
+5 °C	6.0	15	50
+10 °C	5.0	15	40
+20 °C	3.0	12	35
+30 °C	2.0	12	30

* The quantity of hardening powder is always related to the quantity of resin.

👁 For further information, please refer to the separate product information sheet "SILIKAL® Hardening Powder".

👁 Other relevant documentation: **Technical Documentation Data sheet**

SILIKAL® Additive ZA	SILIKAL® Additive ZA
SILIKAL® Hardening powder	SILIKAL® Hardening powder
General processing information	AVH
The substrate	DUG
Information on safety and protection	SUS
Storage and transport	LUT

Silikal product information

Version R 17 – 3.00.A

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Data sheet SILIKAL® R 52

Sheet 2 of 2

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SILIKAL® RI/21 is a pasty, quick-hardening 2-component methacrylic-based adhesive. It was specifically developed for bonding steel to concrete substrates.

Application

Tensile bond adhesive: To bond adhesive strength testers of steel to concrete or floor coatings to determine the adhesive strength. The tensile bond adhesive has been approved by the BEB (Bundesverband Estrich und Belag, Federal Association for Screeds and Coverings) to measure concrete strength, since it is a pasty adhesive and therefore cannot penetrate into the concrete as conventional thin resin adhesives which, as a consequence, artificially improve adhesive strength values.

Natural stone adhesive: Broken granite or marble slabs or other natural stones may be repaired by using this adhesive. It is very popular among natural stone working teams for the rapid repair of steps, window sills or ceramic objects.

Concrete adhesive: The quick-hardening adhesive is also very useful for bonding concrete components, e.g. in mould construction, model making or in a precast element facility.

Building adhesive: Adhesion to PVC plastics is excellent. This allows for permanently bonding PVC pipes or sections, e.g. PVC angle sections as drip edge beneath concrete slabs on balconies. Fixing of PVC pipes for prefabrication on concrete or steel components.

Characteristics of RI/21 as delivered

Consistency	pourable and spreadable, thixotropic
Density at +20 °C	1.2 g/cm ³
Viscosity at +25 °C	40 – 60 Poise
Added hardener	5 pbw.

Characteristics of RI/21 in the hardened state

Temperature	Pot life	Hardening time	Tensile strength of 20 N/mm ²
-10 °C	approx. 13 min	approx. 60 min	after approx. 4 hours
0 °C	approx. 9 min	approx. 45 min	after approx. 2 hours
+10 °C	approx. 7 min	approx. 30 min	after approx. 2 hours
+20 °C	approx. 5 min	approx. 20 min	after approx. 1 hour

Other relevant documentation: **Technical Documentation Data sheet**

SILIKAL® Hardening powder	SILIKAL® Hardening powder
General processing information	AVH
The substrate	DUG
Information on safety and protection	SUS
Storage and transport	LUT

SILIKAL® R 90 Adhesive is a solvent free, fast curing 2-component adhesive compound based on a medium flexible Methacrylic resin for layer thicknesses of 1,5 – 3 mm, preferable 2 mm. The quick curing time of less than 1 hour and the excellent chemical resistance enables a fast working procedure.

Application

The application is being recommended directly onto the asphalt or concrete surface without primer. It can be used for fixing metal or PVC profiles to walls or floors, as well as tiles, concrete blocks like curb stones, road marking cat eyes, polymer concrete parts or prefabricated braille tiles. Surface must be dense, dry, dust and oil free. Since the application is very simple, ordinary comb trowels can be used.

Calculate the area per m² and thickness of 2 mm in average. A thickness can vary depending on the evenness of the surface and item. A 2 mm thickness in average means a consumption of appr. 4 kg/m². Mix the calculated amount of the SILIKAL® R 90 Adhesive with the right amount of BPO Hardening Powder (see table). Stir for 1 minute and avoid lumps in the mixture. Masking tape can be used to collect the surplus adhesive beside the fixed item to protection.

Potlife is appr. 10 – 15 minutes. Curing time about 1 hour.

Guideline recipe and batch quantities

Item	Component	Guideline recipe (% by weight)	Comments	Batch for 10 litre bucket	
				10 kg	10 litres
1	SILIKAL® R 90 Adhesive	100 %		10 kg	10 litres
	Total:	100 %	Average consumption: 2 kg/m² per 1 mm thickness	10 kg	10 litres
2	SILIKAL® Hardening Powder	0.5 – 2 % related to item 1	See “Hardener dosages” table for quantities	50 – 200 g	

Characteristics of R 90 as delivered

Property	Measuring method	Approx. value
Viscosity	Visual	Pasty, thixotrope
Specific Gravity	EN ISO 2811-2	1.75 g/cm ³
Flash point	DIN 51 755	+10 °C
Pot life at +20 °C (100 g, 1 % pbw. hardening powder)		approx. 10 – 15 min.
Application temperature		+5 °C to +40 °C
Recommended Thickness	Wet film comb	2 mm (1.5 – 3 mm)

Hardener dosages depending on surface and item temperature

Temperature	Hardening powder % pbw. *	Pot life approx. min.	Hardening time approx. min.
+5 °C	2.0	15 – 20	50
+10 °C	1.5	12 – 17	40
+15 °C	1.0	12 – 17	35
+20 °C	1.0	10 – 15	30
+25 °C	1.0	8 – 13	30
+30 °C	1.0	8 – 13	25
+35 °C	0.5	5 – 10	25
+40 °C	0.5	5 – 10	20

* The quantity of hardening powder is always related to the quantity of resin.

👁 For further information, please refer to the separate product information sheet “SILIKAL® Hardening Powder”.

SILIKAL® R 90 Adhesive

2-component MMA-adhesive for the building industry and road construction



Delivery form and shades

- 5 kg bucket

Not pigmented (If required the adhesive can be pigmented by adding 1 – 3 % SILIKAL® Pigment Powder).

Storable

Can be stored for 6 months. Store in a cool (< 25 °C), dry, frost-free place.
Do not expose to direct sunlight!

Labelling

Flammable, irritant.

Equipment cleaning

Use Ethylacetate, Acetone or MEK immediately after use.

Other relevant documentation: **Technical Documentation Data sheet**

SILIKAL® Hardening powder	SILIKAL® Hardening powder
General processing information	AVH
The substrate	DUG
Information on safety and protection	SUS
Storage and transport	LUT

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Version R 17 – 3.00.A

August 2016

Data sheet SILIKAL® R 90

Sheet 2 of 2

Mortar Systems Technical Documentation

Summary of Specifications



Initial Comment

The contractor must ensure that the substrate is suitable before carrying out the work described below. The client must be given written notice of any changes to the work planned, when this is not suitable for the condition of the substrate. The current version of Silikal information systems "Technical Documentation" must be observed.

Item	Unit	Description of Work	Unit Price €	Total Price €
1	m ²	<p>Surface Preparation</p> <p>The possible substrates are concrete, cement screeds, asphalt*. The substrate must be dry, sufficiently strong and free of separating substances, such as chemical products, greases and oils. The zones to be repaired (potholes) must be free of loose fragments, cut vertically, and have a depth of at least 5 mm on the outer edge of the damaged areas. Remove rubble and all dust.</p> <p>Prepare the concrete surfaces and screeds in accordance with the local conditions (grinding, milling, sand-blasting) and remove dust with an industrial dust-collector.</p>		
2	m ²	<p>Priming</p> <p>Apply a primer film to the substrate, previously prepared in accordance with item 1, and the side edges. If the primer is completely absorbed by the substrate, a new layer of primer must be applied immediately using the "wet on wet" procedures.</p> <p>Priming concrete/cement screeds: SILIKAL® R 52 resin, measured according to data sheet Approx. consumption: 0.4 kg/m²</p> <p>Priming asphalt: SILIKAL® RU 727 resin, measured according to data sheet Approx. consumption: 0.4 kg/m²</p> <p>On sloping surfaces (e.g. ramps) quartz sand (0.7 – 1.2 mm) must be sprinkled openly into the primer. Approx. consumption: 0.2 kg/m² of sand</p>		

* SILIKAL® R 16 mortar or SILIKAL® R 17 mortar only can be used on asphalt for bonding kerb stones, or can be used to fill in into removed asphalt within a section of an asphalt screed.

Silikal product information

Version R 17 – 3.00.A

August 2016

Summary of Specifications

Sheet 1 of 2

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Mortar Systems Technical Documentation

Summary of Specifications



Item	Unit	Description of Work	Unit Price €	Total Price €
3	Linear metres	<p>Alternative item</p> <p>Open (expand) the cracks – without any movement – in concrete surfaces and beds, remove loose fragments, clean edges of crack, removing all dust. Use cramps if necessary. Seal previously opened cracks by injecting SILIKAL® R 51 resin, (or SILIKAL® R 41 resin), going over the surface with the same material which, depending on the width of the crack, must have the same thixotropic properties or incorporate quartz powder or sand (approx. 1 : 2).</p>		
4	kg	<p>SILIKAL® R 17 mortar</p> <p>Make and apply the SILIKAL® R 17 mortar 2-component methacrylate (MMA) resin mortar to the surfaces that have been previously primed in the way described in item 2 of the data sheet. Minimum layer thickness: 5 mm. Roughen or smooth the surface directly.</p> <p>Layer thickness: d = _____ cm Approx. consumption: 19.8 kg/m² with a 1 cm thick layer.</p>		
4a	kg	<p>Alternative item</p> <p>With thicknesses over 25 mm, fire-dried quartz aggregate with a 2 – 8 mm grain size should be added, following the instructions on the data sheet.</p> <p>Layer thickness: d = _____ cm Approx. consumption: 21.4 kg/m² with a 1 cm thick layer.</p>		
4b	kg	<p>Alternative item</p> <p>With thicknesses over 50 mm, fire-dried quartz aggregate with a 2 – 8 mm and 8 – 16 mm grain size should be added, following the instructions on the data sheet.</p> <p>Layer thickness: d = _____ cm Approx. consumption: 22.3 kg/m² with a 1 cm thick layer.</p>		

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Summary of Specifications

Sheet 2 of 2



Expect more from your floor.

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Reactive resins and polymer
concrete for industrial floors
and civil engineering projects

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