



KLB-SYSTEM EPOXID EP 216 Universal

All-purpose, pigmented 2-component epoxy resin coating and top coat for industrial floors or as surface protection system OS 8 in accordance with DAfStb directive

Packaging units



Article no.	Packaging	Content (kg)	Units/pallet
AL1280-50	Bucket combo	10.00 kg	30
AL1280-30	Hobbock combo	30.00 kg	12

Product characteristics

Mixing ratio parts by weight	A : B = 4 : 1
Mixing ratio parts by volume	A : B = 100 : 38
Processing time	10 °C / 50 °F : 70 - 90 min. 20 °C / 68 °F : 30 - 35 min. 30 °C / 86 °F : 15 - 20 min.
Processing temperature	Minimum 10 °C / 50 °F (room and floor temperature)
Curing time (accessibility)	10 °C / 50 °F : 24 - 36 hrs. 20 °C / 68 °F : 14 - 18 hrs. 30 °C / 86 °F : 10 - 14 hrs.
Curing	48 - 72 hours until mechanical load at 20 °C / 68 °F 7 days until chemical load at 20 °C / 68 °F
Further coatings	After curing, but after 48 hours at the latest at 20 °C / 68 °F
Consumption	Top coat: 0.550 - 0.900 kg/m ² Thin coat: 0.800 - 1.5 kg/m ² Standard coat: 1.3 - 1.5 kg/m ² for each mm layer
Packaging	Bucket combo 10 kg, Hobbock combo 30 kg
Colours	KLB standard colours – see chart. Other colours upon request! For scattered coatings with coloured sand KLB-Colorsand CQS-46xx, please refer to the colour chart of the coloured sand!
Shelf life	12 months (originally sealed)

Product description

KLB-SYSTEM EPOXID EP 216 Universal is an all-purpose, pigmented 2-component epoxy resin coating for hard-wearing industrial coatings, and as surface protection system in accordance with DAfStb guidelines OS 8 "Chemically-resistant coatings for drivable, heavily loaded surfaces".

KLB-SYSTEM EPOXID EP 216 Universal has a high-quality formulation with very good coverage. Due to its low viscosity, the product is suitable for both rolled coatings, and as top sealer for scattered, slip-resistant coverings.

For the production of smooth coatings, the material is suitable from a layer thickness of 1 to 4 mm. The coating material may be mixed with fire-dried quartz sand (grain size 0.1/0.3 mm) up to 0.7 parts by weight. Mixing with quartz sand is useful and economic for layers starting at 2 mm. The coating material has good processing, self-levelling and smoothing properties.

KLB-SYSTEM EPOXID EP 216 Universal has well balanced properties and may be used universally. Due to this versatility in the application possibilities, stock-keeping can be reduced.

The hardened coating is very resistant to mechanical stresses and has a good resistance to many chemicals. It is resistant to water, salts, saline and alkaline solutions as well as diluted mineral acids like salt and sulfuric acid. It is also resistant to many solvents such as petrol, fuels, greases, oils, etc. Short-term resistance is given for concentrated mineral acids, for diluted organic acids such as acetic acid, lactic acid, etc.; no permanent resistance exists for chlorinated hydrocarbons, esters, concentrated nitric acid and others. For chemical resistance requirements, please ask for a separate consultation.

KLB-SYSTEM EPOXID EP 216 Universal can be supplied in a variety of colours although slight colour deviations may occur due to technical reasons. Epoxy resin coatings are subject to little colour changes which may become visible when using pale colours. However, **KLB-SYSTEM EPOXID EP 216 Universal** shows only slight colour change for an epoxy resin product. Light colour shades, especially yellow, orange and white shades, do not have sufficient covering capacity in one application layer, so that the sand heads remain visible. To obtain an even colour impression, a second sealing coat may have to be applied.

Important note: **EP 216** is not suitable as supporting layer for a subsequent sealer application of glass beads and **EP 175 Spezial**. In this case, we recommend using **EP 220**.

Area of application

- Thin coatings 0.8 - 1.5 mm for light mechanical load.
- Smooth coatings for commercially used areas with medium mechanical load, e.g. production or storage facilities in many economic sectors (2 mm coating).
- Smooth coatings for commercially used areas with high demands on mechanical load, e.g. production or storage facilities in many economic sectors (3 - 4 mm coating).
- Plain-coloured top sealer for scattered coatings.
- Pigmented supporting layers for decorative, coloured sand scattered coatings and subsequent sealing coats, e.g. with **EP 175 Spezial**, **EP 174**, or even **EP 216 Universal**.
- Robust coating for drivable, heavily loaded coatings in accordance with DAfStb guidelines OS 8.

Product features

- also suitable for thin layers
 - all-purpose use
 - good resistance to water and chemicals
 - only slightly yellowing
 - Total Solid according to GISCODE (Test method "Deutsche Bauchemie")
 - free of deleterious substances against varnish
 - can be filled with fire-dried quartz sand
 - also available in special colours
 - very good levelling
 - proven quality
 - coloured surface
 - glossy
 - resistant to abrasion and wear
-

Technical data

Viscosity - Component A+B	1800	mPas	DIN EN ISO 3219 (23 °C / 73.4 °F)
Density - Component A+B	1.42	kg/l	DIN EN ISO 2811-2 (20 °C / 68 °F)
Water absorption	< 0.2	weight-%	DIN 53495
Flexural strength	> 45	N/mm ²	DIN EN 196/1
Compressive strength	> 55	N/mm ²	DIN EN 196/1
Shore-hardness D	80	-	DIN 53505 (after 7 days)
Abrasion (Taber Abraser)	55	mg	ASTM D4060 (CS10/1000)

The values established in tests are average values. Deviations from the product specification may occur.

Included in systems

- System A1 - KLB INDUSTRIAL EP Standard
- System A3 - KLB INDUSTRIAL EP RX
- System H1 - KLB KITCHEN EP Standard
- System K1 - KLB PARKING EP OS 8
- System H5 - KLB FOOD EP RX Decor
- System K5 - KLB PARKING EP OS 8 Economic

Please visit our website to get more information about our KLB systems: www.klb-koetzal.com

Tests

The following external test certificates are available:

- Classification of the fire behaviour according DIN EN 13501-01:2010-01: B_{fl}-s1.
- Scattered coatings with slip resistance grade 10, R11/V4, R11/V6, R11/V8, R12/V4, R12/V6, R13/V8 possible, according to DIN EN 16165 and DIN 51130.
- Slip resistance grade R9 and R10 possible, according to DIN 51130 and BGR 181.
- Suitable for use in foodstuffs according § 31 para. 1, German Food and Feed Code (german law LFGB).
- Ease of decontamination according DIN 25415-1: excellent.
- Tested according to DIN EN 1504-2 in consideration of DIN V 18026 "Surface protection systems for concrete from products according to DIN EN 1504-2", according to the test class OS 8 "Chemically-resistant coatings for drivable, heavily loaded surfaces".
- With proof of usability as an industrial kitchen coating when used within the system.
- LABS-compliant according to PV 3.10.7. (VW test)
- Product is compliant with DIN EN 13813: 2003-01 and DIN EN 1504-2:2004

Note:

To receive the test results, reports and statements of performance of the relevant system please contact your KLB consultant.

Build-up of coats

Smooth thin coatings

- Prime with one of the recommended KLB base coats, like **EP 50**, **EP 51 RAPID S**, **EP 52 Spezialgrund**, or **EP 52 RAPID**, consumption approx. 0.3 - 0.4 kg/m², depending on the substrate.
- Apply a scratch coat for an even substrate, e.g. with **EP 50**, **EP 51 RAPID S** and mixed sand **KLB-Mischsand 2/1**. Mixing ratio approx. 1 : 0.8 parts by weight, consumption approx. 0,8 - 1,3 kg/m².
- Roll on or squeegee the coating **EP 216 Universal** with a toothed trowel (**Toothed blade S6** or Pajarito TKB-S2), consumption approx. 1.2 - 1.5 kg/m².

Smooth coating medium layer thickness (2 mm)

- Prime with one of the recommended KLB base coats, like **EP 50**, **EP 51 RAPID S**, **EP 52 Spezialgrund**, or **EP 52 RAPID**, consumption approx. 0.3 - 0.4 kg/m², depending on the substrate.
- Apply a scratch coat for an even substrate, e.g. with **EP 50**, **EP 51 RAPID S** and mixed sand **KLB-Mischsand 2/1**. Mixing ratio approx. 1 : 0.8 parts by weight, consumption approx. 0.8 - 1.3 kg/m².
- Roll on or squeegee the coating **EP 216 Universal** with a toothed trowel (**Toothed blade RS4** or Pajarito 48), consumption approx. 2.6 - 3.0 kg/m² for approx. 2 mm of layer thickness. Coating can be mixed with quartz sand (0.1/0.3 mm) up to 1 : 0.7.
- Optional: scatter with silicium carbide, delustering agent or decorative flakes (chips).
- Optional: with light mechanical loads without any industrial truck traffic, seal the surface with a suitable top sealer **EP 705 E/EP 706 E**, **PU 811 E/PU 812 E**, **EP 740 E/EP 742 E**, **PU 880** or **PU 882**. Before applying the sealer, the coating must be allowed to cure for at least 18 hours. Follow the instructions for the recommended sealers.

Surface protection system in accordance with DAfStb guidelines OS 8 (System K1)
Robust coating for drivable, heavily loaded surfaces

- Prime with **EP 5520**, consumption approx. 0.3 - 0.4 kg/m².
- Alternatively, **EP 5530** can be used as pre-filled primer, consumption approx. 0.3 - 0.6 kg/m².
- Optional: open scattering with quartz sand, grain size 0.3/0.8 mm, consumption approx. 0.5 - 1.0 kg/m².
- Fill the **EP 216 Universal** wearing layer with approx. 15 % of quartz sand of grain size 0.3/0.8 mm and mix until homogeneous. Apply **EP 216 Universal** with a trowel by pulling "over grain". Consumption mixing: approx. 1.0 - 1.2 kg/m².
- Roughness depth surcharge:

Roughness depth surcharge 0.5 mm dz of > 0.7 kg/m²

Roughness depth surcharge 1.0 mm dz of > 1.4 kg/m²

In accordance with the maintenance directive TR for concrete structures, corresponding layer thickness surcharges are required when there is roughness. The control of the layer thicknesses and, if necessary, the adjustment of the resulting consumption quantities must be carried out by the processor.

- Scatter completely with quartz sand 0.3/0.8 mm, consumption approx. 3.0 - 4.0 kg/m².
- After curing, sweep off excess sand, chip off or vacuum thoroughly until no more grain or sand is being released.
- Apply **EP 216 Universal** as a top sealer with a rubber squeegee, then distribute with a velour roller in crosswise motion and roll off evenly. Consumption approx. 0.55 - 0.7 kg/m².

Important notes:

- The maintenance guidelines require compliance with the layer thicknesses.
- For OS 8, a minimum layer thickness of 2.5 mm plus the current roughness depth layer thickness aggregate dz is required.
- According to the maintenance guidelines, the total layer thickness including primer and top coat can be reduced to a minimum of 1.5 mm for pure protective measures in the sense of DIN EN 13813. According to RiLi-SIB, the standard structure OS 8 requires a primer layer. Deviating from this, it is permissible to work without a primer, provided that the total layer thickness of 2.5 mm is adhered to.
- Please observe the maintenance guidelines for further requirements.

Application on walls and pedestal areas for parking areas

- Prepare the substrate, e.g. by milling, grinding or blasting.

- Apply the **EP 5520** primer, consumption approx. 0.25 - 0.35 kg/m². In order to avoid the primer to run off, 0.5 - 2% of suspending agent **Stellmittel 5 FT** can be added.
- Alternatively, in case of larger pores and shrinkage cavities: smooth the surface with **EP 5520** while adding 3 - 5% of suspending agent **Stellmittel 5 FT** so that all pores are filled, consumption variable and depending on pore size.
- After curing, sharply apply **EP 216** with the addition of approx. 1.5 - 2.5% of suspending agent **Stellmittel 5 FT** and 10 - 15% of quartz sand 0.3/0.8 mm.
- Scatter the fresh coating entirely with quartz sand 0.3/0.8 mm, consumption approx. 1.5 - 2.5 kg/m².
- Apply **EP 216 Universal** as a top sealant while adding 0.5 - 1% of suspending agent **Stellmittel 5 FT** with a velour roller, consumption approx. 0.5 - 0.7 kg/m².

Substrate

The substrate to be coated must be even, dry, free of dust, sufficiently resistant to tension and compression as well as be free from weakly-bonded components or surfaces. Materials impairing adhesion such as grease, oil and paint residues should be removed with suitable measures. Observe the information issued by the trade associations, e.g. the most recent versions of BEB worksheets KH-0/U and KH-0/S as well as the notes provided in the product information for the recommended base coats, like **EP 50**, **EP 51 RAPID S**, **EP 5520** and **EP 5530**. The surface strength must then be at least 1,5 N/mm². For OS 8, adhesive strength of ≥ 2 N/mm² (mean value) is to be achieved, the smallest permissible value is 1.5 N/mm². For concrete, moisture content must not exceed 4.5 CM-%, remaining residual humidity. The possibility of moisture ingress from the rear must be permanently excluded. Base coats may not be left open for more than 48 hours or must be scattered with quartz sand. The substrates to be coated should be prepared mechanically, preferably by shot-blasting. The prepared area must be saturated, pore-free and primed carefully. It is often difficult to judge the necessary pore-free condition of substrates. It is therefore recommended that a scratch coat be applied to smooth the surface. If the substrate has not been primed to be pore-free, bubbles and pores can develop in the coating due to air rising from the substrate. In case of doubt, we recommend testing on a trial surface.

Mixing

EP 216 Universal will be supplied in coordinated quantities in combo-packaging. With such, the factory-weighed material is available in exactly the right mixing ratio. The package of Component A has sufficient volume to contain the entire packaging unit. Empty all of the hardener compound B into the resin. Blend with a slow speed mixer (200 - 400 r/pm) for at least 2 - 3 minutes until a homogeneous, streak-free compound forms. To prevent mixing errors, empty ("repot") the resin/hardener mixture into a clean container and mix it once again briefly.

Addition of quartz sand: add the additives only after the components have been pre-mixed. Suitable is fire-dried quartz sand with a grain size of 0.1/0.3 mm. Do not use quartz flour or sand blends. The added quantities depend on layer thickness, temperature, and type of sand. **EP 216 Universal** can usually be mixed with up to 0.7 kg of quartz sand per 1 kg of coating material. For thin coats, the addition of sand is not recommended as the self-levelling properties might deteriorate in the process.

Addition of suspending agent: for coating concave coverings, **KLB-Stellmittel 5 FT** has to be added for a stable adjustment. After mixing components A and B, add 3 - 5 % of the suspending agent for a material that is free of streaks and adequately stable. When coating floor surfaces with slopes, adding 0.1 - 1.0 % of thixotropic agent **KLB-Stellmittel 5 FT** may be necessary to keep the material in place. It is advantageous to work with sand scattering in these areas.

Processing

Coatings: after mixing, process the material immediately with a squeegee or toothed trowel (e.g. RS4 or Pajarito 48 for approx. 2 mm, and Pajarito 7 for approx. 1 mm) by pulling out an even layer on the prepared substrate. The product is adjusted for optimum deaeration, however, rolling with a spiked roller is recommended to improve

the wetting of the substrate, to optimise levelling and to remove remaining air bubbles. This should be carried out time-delayed after approx. 10 - 20 minutes. In order to work seamlessly, always work "fresh-in-fresh" and define work areas before starting.

For reasons of deaeration, do not scatter too early; the optimum time is at 20 °C / 68 °F after 10 - 30 minutes. Scatter with sand until the area is completely covered. Scattering too late may cause an uneven surface with bald spots to appear later on.

Top sealer for scattered coatings: with scattered coatings, once the base layer has hardened, remove excess grains from the surface by sweeping or vacuuming until no more quartz grains come loose. If the surface is supposed to have only minimal slip resistance or roughness, the existing sand can be ground slightly to blunt the tips of the grains. Then pour the fresh mixture in portions onto the floor. The compound is evenly distributed and pulled over the surface with a smooth rubber squeegee, a Kaupp trowel or a steel trowel depending on the desired material quantity. Ensure even application and avoid ponding. Rigid trowels create smoother surfaces, while soft trowels result in a coarser structure. For a uniform surface and to avoid the formation of bald spots, re-roll with a velour roller. Using a roller for application results in a rougher surface. Process the work areas "fresh-in-fresh".

Floor and air temperature must not fall below 10 °C / 50 °F and humidity must not exceed 75 %. The difference in floor and room temperature must remain less than 3 °C / 3 K / 5.4 °F so as not to impede the curing process. If a dew-point situation arises, regular curing will not be possible with hardening problems and spotting to occur. Exposure to water should be avoided during the first 7 days. The specified hardening times apply for 20 °C / 68 °F; temperatures below this require longer processing and curing times, while higher temperatures require shorter times.

If working conditions are not complied with, the technical properties of the end product may deviate from those specified.

Special remarks for parking areas:

High-rising components must be protected by applying the coating at a height of 15 - 50 cm away from the floor, depending on the frequency and risk of splashing. In order to do so, a concave or triangular coving with a minimum side length of 30 x 30 mm must be placed onto the wall or pedestals within a dense structure. The products to be used and the build-up proposal can be found in the section "Build-up of coats", subsection "Application on walls and pedestal areas".

Depending on the construction, we recommend carrying out maintenance visits twice a year, thus at least once a year at the beginning of winter as well as a repair works of possibly damaged areas.

Cleaning

To remove fresh contamination and to clean tools, use **VR 24** or **VR 33** immediately. Hardened material can only be removed mechanically.

Separate cleaning and care recommendations are available for cleaning floors produced with KLB coatings and sealers.

Storage

Store in dry and if possible, at frost-free conditions. Ideal storage temperature is between 10 - 20 °C / 50 - 68 °F. Bring to a suitable processing temperature before application. Tightly re-seal opened packages and use up the content as soon as possible.

Special remarks

Always process coloured coatings in the same batch, observe the legal information on the colour chart, which is available at www.klb-koetzta.com/downloads. The

product is regulated by the German Ordinance on Hazardous Substances (GefStoffV), the German Ordinance on Industrial Safety and Health (BetrSichV), and transport regulations for hazardous goods. The necessary information is contained in the DIN Safety Data Sheet. Observe all identification information on the container label!

GISCODE: RE30

Indication of VOC-content:

(EG-Regulation 2004/42) Maximum Permissible Value 500 g/l (2010,II,j/lb): Ready-for-use product contains < 500 g/l VOC.

CE marking

CE	
1119	
KLB Kötztal Lacke + Beschichtungen GmbH Günztalstraße 25 FRG-89335 Ichenhausen	
13	
EP216-V1-022013	
DIN EN 1504-2:2004	
Surface protection products-coating DIN EN 1504-2: ZA.1d,ZA.1f,ZA.1g	
Linear shrinkage	< 0.3 %
Compressive strength	Class I
Abrasion resistance	Mass loss < 3000 mg
CO ₂ -permeability	SD > 50m
Water vapour permeability	Class III
Capillary water absorption and water permeability	< 0.1 kg/m ² *h0.5
Compatibility to temperature change	≥ 2.0 (1.5) N/mm ² <small>The value in brackets is the smallest permissible value per reading.</small>
Resistance to increased chemical excavation	Loss of durability < 50%
Resistance to impact	Class I
Tear-test for adhesive strength evaluation	≥ 2.0 (1.5) N/mm ² <small>The value in brackets is the smallest permissible value per reading.</small>
Fire behaviour	B _s -s1
Grip	Class III

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13	
EP216-V1-022013	
DIN EN 13813:2003-01	
Synthetic resin screed mortar DIN EN 13813: SR-B1.5-AR0.5-IR7	
Fire behaviour	B _s -s1
Emission of corrosive substances	SR
Wear resistance BCA	AR 0.5
Adhesive tensile strength	B 1.5
Impact resistance	IR 7



Please consider the latest version of this product information on our website.

All stated information is based on our experience and technical preparation. We guarantee the correct and proper quality of our products. We do not assume any responsibility for the work not carried out by us, since we have no influence on the processing or processing conditions. We recommend on-site trials to be conducted in individual cases. With the publication of this new KLB product information, all prior information loses validity. The latest version is available electronically on our website www.klb-koetzal.com. In addition, our "General Terms and Conditions" apply.