

Laying PU-BETON correctly



Tips and recommendations

KLB-SYSTEM PU-BETON

Application recommendation

KLB-SYSTEM PU-BETON

This application recommendation is intended to provide you, as a professional installer of our **KLB-SYSTEM PU-BETON** mortar coverings, with an overview for selecting a suitable system. It also contains processing instructions and requirements, substrate types and preparatory measures. The brochure is completed with tips for the later user, e.g. on cleaning and maintenance.

All stated information is based on our experience and technical preparation. However, they do not replace the proper examination of the substrate and the conditions on site. Knowledge of the applicable norms and the current state of the art is assumed.

The installation must be adapted to the building structure and the requirements of the project, which is the installer's responsibility.

Please observe the current product information and safety data sheets of the materials

mentioned. In any case, pay attention to the recommendations and notes listed there.

If you have any further questions or special demands, do not hesitate to contact the Technical Sales Service of KLB Kötztal Lacke + Beschichtungen GmbH.

All stated information is based on our experience and technical preparation. It is impossible to consider each individual case in the recommendations listed, so the information is only of indicative nature. We ask you to seek detailed advice from our office as the case may be. We guarantee the correct and proper quality of our products. We do not assume responsibility for the work not carried out by us, since we have no influence on the processing or processing conditions on site. We recommend on-site trials to be conducted in individual cases. This advertising brochure contains the current status of KLB technology at the time of publication. Only the latest KLB product data sheet is authoritative for all technical questions. The latest version is available electronically on our website www.klb-koetzthal.com. In addition, our "General Terms and Conditions" apply.

Use biocidal products carefully. Always read the label and product information before use.

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1. Application areas

KLB-SYSTEM PU-BETON is a heavy-duty floor covering mainly used in industry with high demands on thermal, mechanical, hygienic and chemical stress. **PU-CONCRETE** coating systems are particularly well suited for applications with frequent wet exposure, also with hot water. The coverings are suitable for surfaces with high hygiene requirements, e.g. in food production. They can be cleaned with steam jet equipment if the conditions are right.

Compared to conventional synthetic resin coatings, **PU-CONCRETE** floorings offer an increased glass transition and heat deflection temperature. This is why the material provides outstanding thermal resistance with moist heat up to 130 °C / 266 °F, with dry heat up to 150 °C / 302 °F, depending on the system used. Its property profile enables, among other things, **KLB-SYSTEM PU-BETON** to be used in the following areas of application:



Food production

- bakeries, baker's shops, confectioneries
- dairy farms, cheese factories, milk industry
- butchers, slaughterhouses, meat industry
- fruit and vegetable processing
- fish and poultry processing

Food processing

- kitchens (commercial kitchens of any size)
- production of foodstuffs and Convenience Food
- fast food, canning, etc.
- canteens

Breweries and beverage production

- breweries
- beverage industry, mineral water bottling
- distilleries
- wine press houses, wine production
- soft drink bottling

Chemical and pharmaceutical industry

- laboratories
- technical centres
- production areas
- Storage and processing of chemicals

Further industries

- mechanically highly stressed areas
- chemically highly stressed areas
- surfaces that need to be intensively cleaned
- increased temperature loads

2. Product overview

PU-CONCRETE consists of well-coordinated coating materials.

They are always supplied in a range of 3 single products, which only in the prepared mixture result in the temperature and chemical-resistant floor coverings.

The following complementary system components are available:

Layer	KLB product
Primer / base layer / levelling coat	KLB-SYSTEM PU-BETON 4050 Grundierung KLB-SYSTEM PU-BETON 4045
Stable consistency / coving mortar	KLB-SYSTEM PU-BETON 4012 Standfest
Smooth / scattered covering, 6 mm thickness	KLB-SYSTEM PU-BETON 4006
Smooth / scattered covering, 9 mm thickness	KLB-SYSTEM PU-BETON 4009
Slip-resistant R11 covering, 9 mm thickness	KLB-SYSTEM PU-BETON 4011 Grip
Top sealer for scattered coatings	KLB-SYSTEM PU-BETON 4080 Kopfsiegel KLB-SYSTEM PU-BETON 4080 Clean Kopfsiegel
Elastic, fungicidal joint compound	KLB-SYSTEM POLYURETHAN PU 465 – stable KLB-SYSTEM POLYURETHAN PU 465 LQ – pourable

Primer / base layer

KLB-SYSTEM PU-BETON 4050 Grundierung

KLB-SYSTEM PU-BETON 4050 Grundierung is a solvent-free 3-component system primer. Its use in combination with **KLB-SYSTEM PU-BETON** allows for highly durable flooring systems in wet areas with hot water and chemical exposure. The material hardens by chemical cross-linking, similar to the **KLB-SYSTEM PU-BETON** coverings themselves, to form a robust, well adhesive base for subsequent layers. By closing the pores, the absorbency is reduced and a coatable surface is created. Depending on the temperature, following coatings may be applied within 12 - 24 hours at 20 °C / 68 °F. Overcoating must take place within 48 hours. Due to the adjusted system, **KLB-SYSTEM PU-BETON** materials have comparatively short processing times, which requires a well-organised workflow as well as an experienced team.

KLB-SYSTEM PU-BETON 4050 Grundierung consists of the following components:

Packaging	Components	
1 unit	PU 4050 Comp. A	Binding agent, liquid
1 unit	PU 4050 Comp. B	Binding agent, liquid
1 unit	PU 4050 Comp. C	Filling material, stable



Levelling and roughness compensation

KLB-SYSTEM PU-BETON 4045

KLB-SYSTEM PU-BETON 4045 is a high-quality 3-component polyurethane levelling mortar. The product consists of reactive resin **KLB-SYSTEM PU-BETON 4000** Components A and B, and a mineral additive **KLB-SYSTEM PU-BETON 4045** Component C. **KLB-SYSTEM PU-BETON 4045** is used as intermediate and levelling layer. The equalising mortar has to be used preferably on rough, milled or blasted substrates in thicknesses of 2 mm up to approx. 10 mm. The levelling layer can be applied on low-absorbent substrates without any primer. On highly absorbent substrates, **KLB-SYSTEM PU-BETON 4050** has to be applied as base coat.

KLB-SYSTEM PU-BETON 4045 consists of the following components:

Packaging	Components	
1 unit	PU 4000 Comp. A	Binding agent, liquid
1 unit	PU 4000 Comp. B	Binding agent, liquid
1 unit	PU 4045 Comp. C	Filling material, stable



Stable consistency / coving mortar

KLB-SYSTEM PU-BETON 4012 Standfest

KLB-SYSTEM PU-BETON 4012 Standfest is a system product that is used as a supplement to the KLB-SYSTEM PU-BETON range for the production of concave and triangular covings as well as plinths. In case of very uneven floors, the material can be used as a mortar to fill larger holes, break-outs, voids, etc., prior to the application of coatings. Depending on the temperature, following coatings may be applied within 10 - 14 hours at 20 °C / 68 °F. Overcoating must take place within 48 hours. Due to the adjusted system, KLB-SYSTEM PU-BETON materials have comparatively short processing times, which requires a well-organised workflow as well as an experienced team.

KLB-SYSTEM PU-BETON 4012 Standfest consists of the following components:

Packaging	Components	
1 unit	PU 4012 Comp. A	Binding agent, liquid
1 unit	PU 4012 Comp. B	Binding agent, liquid
1 unit	PU 4012 Comp. C	Filling material, stable
1 unit	Pigment	Optionally, as required!



Smooth / scattered covering, 6 mm thickness

KLB-SYSTEM PU-BETON 4006

KLB-SYSTEM PU-BETON 4006 is a high-quality, trowelable 3-component coating which is applied in a layer thickness of 6 mm. It is suitable for heavy-duty floor surfaces with exposure to high temperature, chemicals and mechanical loads. Compared to conventional synthetic resin coatings, **KLB-SYSTEM PU-BETON 4006** offers a higher temperature resistance of up to 90 °C / 194 °F. For an increased degree of thermal stability, **KLB-SYSTEM PU-BETON 4009** is available in layers of 9 mm.

By using suitable scattering material (corundum or quartz sand), the covering can be set to different slip resistance grades from R10 to R13. Corresponding test certificates are available and can be requested from us. Scattered surfaces must then be sealed with **KLB-SYSTEM PU-BETON 4080 Kopfsiegel** or **KLB-SYSTEM PU-BETON 4080 Clean Kopfsiegel**. Depending on the temperature, following coatings may be applied within 8 - 10 hours at 20 °C / 68 °F. Overcoating must take place within 48 hours. Due to the adjusted system, **KLB-SYSTEM PU-BETON** materials have comparatively short processing times, which requires a well-organised workflow as well as an experienced team.

KLB-SYSTEM PU-BETON 4006 consists of the following components:

Packaging	Components	
1 unit	PU 4000 Comp. A	Binding agent, liquid
1 unit	PU 4000 Comp. B	Binding agent, liquid
1 bag	PU 4006 Comp. C	Filling material, stable

For larger areas, the liquid components are also available in a double packaging unit instead of the standard one. These are then mixed with 2 bags of Component C.



Smooth / scattered covering, 9 mm thickness

KLB-SYSTEM PU-BETON 4009

KLB-SYSTEM PU-BETON 4009 is a high-quality, trowelable 3-component coating which is applied in a layer thickness of 9 mm. It is suitable for heavy-duty floor surfaces with exposure to high temperature, chemicals and mechanical loads. Compared to conventional synthetic resin coatings, **KLB-SYSTEM PU-BETON 4009** offers an increased glass transition temperature. This is why the material provides outstanding thermal resistance with moist heat up to 130 °C / 266 °F, with dry heat up to 150 °C / 302 °F. It should be noted that the substrate has excellent tensile and compressive strength even with high temperature changes.

By using suitable scattering material (corundum or quartz sand), the covering can be set to different slip resistance grades from R10 to R13. Scattered surfaces must then be sealed with **KLB-SYSTEM PU-BETON 4080 Kopfsiegel** or **KLB-SYSTEM PU-BETON 4080 Clean Kopfsiegel**.

Depending on the temperature, following coatings may be applied within 8 - 10 hours at 20 °C / 68 °F. Overcoating must take place within 48 hours. Due to the adjusted system, **KLB-SYSTEM PU-BETON** materials have comparatively short processing times, which requires a well-organised workflow as well as an experienced team.

KLB-SYSTEM PU-BETON 4009 consists of the following components:

Packaging	Components	
1 unit	PU 4000 Comp. A	Binding agent, liquid
1 unit	PU 4000 Comp. B	Binding agent, liquid
1 bag	PU 4009 Comp. C	Filling material, stable

For larger areas, the liquid components are also available in a double packaging unit instead of the standard one. These are then mixed with 2 bags of Component C.



Slip-resistant R11 covering, 9 mm thickness

KLB-SYSTEM PU-BETON 4011 Grip

KLB-SYSTEM PU-BETON 4011 Grip is a high-quality, trowelable 3-component coating which is applied in a layer thickness of 9 - 10 mm.

It is suitable for heavy-duty floor surfaces with exposure to high temperature, chemicals and mechanical loads. **KLB-SYSTEM PU-BETON 4011 Grip** is already supplied in a defined slip-resistance grade of R11, which saves further work steps to achieve a structured and non-slip surface.

Compared to conventional synthetic resin coatings, **KLB-SYSTEM PU-BETON 4011 Grip** offers an increased glass transition temperature. This is why the material provides outstanding thermal resistance with moist heat up to 130 °C / 266 °F, with dry heat up to 150 °C / 302 °F.

Depending on the temperature, following coatings may be applied within 8 - 10 hours at 20 °C / 68 °F. Overcoating must take place within 48 hours. Due to the adjusted system, **KLB-SYSTEM PU-BETON** materials have comparatively short processing times, which requires a well-organised workflow as well as an experienced team.

KLB-SYSTEM PU-BETON 4011 Grip consists of the following components:

Packaging	Components	
1 unit	PU 4000 Comp. A	Binding agent, liquid
1 unit	PU 4000 Comp. B	Binding agent, liquid
1 bag	PU 4011 Comp. C	Filling material, stable

For larger areas, the liquid components are also available in a double packaging unit instead of the standard one. These are then mixed with 2 bags of Component C.



Top sealer for scattered coatings

KLB-SYSTEM PU-BETON 4080 Kopfsiegel / Clean Kopfsiegel

KLB-SYSTEM PU-BETON 4080 Kopfsiegel is a solvent-free, pigmented 3-component polyurethane system for a final coating of smooth or scattered surfaces based on **KLB-SYSTEM PU-BETON 4006** or **KLB-SYSTEM PU-BETON 4009** and for sealing plinths or covings made with **KLB-SYSTEM PU-BETON 4012 Standfest**.

KLB-SYSTEM PU-BETON 4080 Clean Kopfsiegel is designed to offer preventive protection against bacterial contamination. This allows to create permanently hygienic surfaces, even between the necessary cleaning and disinfection cycles.

After complete curing, the chemical resistance of **KLB-SYSTEM PU-BETON 4080 Kopfsiegel** equals the other **KLB-SYSTEM PU-BETON** systems. Depending on the shade, slight changes in colour may occur. However, this will not affect the technical properties of the material. Depending on the temperature, following coatings may be applied within 16 - 24 hours at 20 °C / 68 °F. Overcoating must take place within 48 hours. Due to the adjusted system, **KLB-SYSTEM PU-BETON** materials have comparatively short processing times, which requires a well-organised workflow as well as an experienced team.

KLB-SYSTEM PU-BETON 4080 Kopfsiegel / Clean Kopfsiegel consist of the following components:

Packaging	Components	
1 unit	PU 4080 Comp. A	Binding agent, liquid
1 unit	PU 4080 Comp. B	Binding agent, liquid
1 unit	PU 4080 Comp. C	Filling material, stable



Pigmented 2-C polyurethane joint compound for construction and expansion joints for PU-BETON

KLB-SYSTEM PU-BETON

PU 465 / PU 465 LQ

The stable joint material **KLB-SYSTEM POLYURETHAN PU 465** and its liquid pendant **KLB-SYSTEM POLYURETHAN PU 465 LQ** are elastic, solvent-free, pigmented 2-component polyurethane joint compounds which are particularly suitable for grouting construction and expansion joints with low movement – preferably together with **PU-CONCRETE** coatings. Already existing expansion joints, that are to be drawn into the **PU-CONCRETE**, may be grouted with **KLB-SYSTEM POLYURETHAN PU 465** and **KLB-SYSTEM POLYURETHAN PU 465 LQ**. Total deformation may not exceed 10% of the joint width.

KLB-SYSTEM POLYURETHAN PU 465 and **KLB-SYSTEM POLYURETHAN PU 465 LQ** result in flexible joints with increased thermal (hot water) and good abrasion resistance, even with traffic load. The joint material is resistant to chemicals, e.g. different solvents, diluted acids and bases, water, oil, grease, salt, and their solutions. Polyurethane joint compounds are subject to slight changes in colour which, however, does not affect their technical properties.

The sealants **KLB-SYSTEM POLYURETHAN PU 465** and **KLB-SYSTEM POLYURETHAN PU 465 LQ** are designed to offer preventive protection against mould growth. This allows to create permanently hygienic surfaces, even between the necessary cleaning and disinfection cycles.

KLB-SYSTEM PU-BETON PU 465 / PU 465 LQ consist of the following components:

Packaging	Components	
1 unit	PU 465 / LQ Comp. A	Binding agent, liquid
1 unit	PU 465 / LQ Comp. B	Binding agent, liquid



Scattered coatings

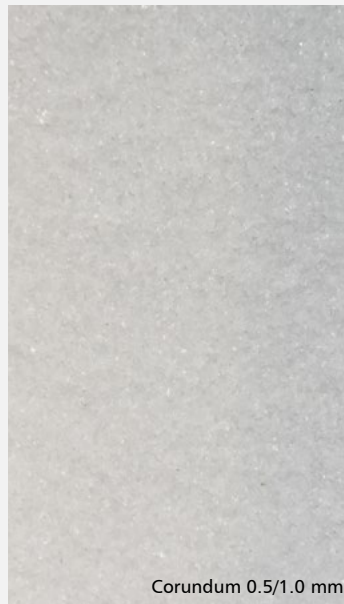
3. Scattering with quartz sand or corundum?

To achieve a certain degree of slip resistance, the scattering of corundum or quartz sand is necessary.

Corundum should always be used for surfaces subject to high mechanical stress, as it is significantly harder than quartz sand.

Suitable grain sizes:

- quartz sand 0.3/0.8 mm or 0.7/1.2 mm
- white corundum 0.5/1.0 mm or 0.6/1.2 mm



4. Suitability of substrates

The substrates must have a sufficiently high strength for the intended use. **KLB-SYSTEM PU-BETON** floor coverings require substrates that are resistant to tension and compression and can withstand subsequent loads – especially those of a thermal nature. Suitable are concrete and screed that meet the requirements of the floor's later use.

Other substrates are not or not generally suited. The suitability of old and renovation surfaces for accepting **PU-CONCRETE** must also be ensured. If necessary, ask for a consultation.

Why are certain substrates not suitable?

Substrates must have sufficient tensile and compressive strength, as **PU-CONCRETE** can build up immense loads, particularly with greater layer thickness and higher temperatures, as well as when the building components are heated through.

This is mainly the case with older concrete surfaces that have been leached out by previous use. Here, it should be checked whether the concrete has to be milled off and partially replaced. Old coverings, such as tile or synthetic resin floors, are usually not suitable and must be removed. Metal substrates cannot be coated with **PU-CONCRETE**.

Suitable substrates

- concrete with a minimum quality of C25/30 according to DIN EN 206
- cement screed and polymer-modified cement screeds with at least CT-C30-F5, bonded in a minimum layer thickness of 60 or 30 mm, according to DIN 18560 part 3
- screeds as separating layer, machine smoothed, polymer-modified, at least CT-C40-F5, with a layer thickness > 65 mm, according to DIN 18560 part 4
- The substrate's tensile strength must be at least 1.5 N/mm².

Unsuitable substrates

- concrete or screed of inferior quality
- old, contaminated or leached out concrete
- lightweight concrete
- magnesia, stone-wood or calcium sulphate screeds
- bituminous substrates (e.g. poured or rolled asphalt, latex asphalt)
- aerated concrete blocks
- bricks
- tiles, clinker bricks
- galvanised or stainless steel

5. Substrate preparation and requirements

The substrates to be coated must be prepared mechanically.

Suitable methods for substrate preparation are

- shot-blasting (to be used preferably)
- milling followed by shot-blasting (recommended if higher material removal on the surface is required)
- high-pressure water jetting (recommended in individual cases)
- intensive diamond grinding (can be suitable for smaller surfaces with lower stress)

If any of the listed methods other than shot-blasting is used, make sure that the following criteria are met: After mechanical substrate preparation, the substrate to be coated must be even, non-slip, sufficiently resistant to tension and compression, clean as well as be free from weakly-bonded and sandy components or impurities. Materials impairing adhesion such as grease, oil and/or paint residues should be removed beforehand, e.g. by cleaning.

The **surface strength** must then be at least 1.5 N/mm².

For anchoring the **PU-CONCRETE**, **anchoring grooves** are to be provided at the end edges, passages, gutters and inlets. These should be approx. 6 to 10 mm deep and wide.

For concrete, the **moisture** content must not exceed 6 CM-%. The possibility of moisture ingress from the rear must be permanently excluded.

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 KLB base coats such as **KLB-SYSTEM PU-BETON 4050 Grundierung** or base and levelling mortar **KLB-SYSTEM PU-BETON 4045**.

Epoxy resin primers such as **KLB-SYSTEM EPOXID EP 52 Spezialgrund** can also be used in individual cases. However, not if higher temperature loads are to be expected.

If epoxy resin primers are used, they must be sanded with fire-dried quartz sand 0.7/1.2 mm for interlayer adhesion. When using **KLB-SYSTEM PU-BETON 4050** as base coat or **KLB-SYSTEM PU-BETON 4045** as intermediate layer, such sanding is not recommended.

After mechanical substrate preparation, the following work steps must be considered and carried out before priming.

6. Substrate pre-treatment

Cracks / static joints (construction joints)

Cracks and construction joints must be sealed with a force fit. For this purpose, they are to be properly opened through a V-shaped incision, cleaned and then grouted with e.g. **KLB-SYSTEM EPOXID EP 50** while adding mixed sand **KLB-Mischsand 2/1** of approx. 1 - 1.5 parts by weight.

Expansion and building joints

Existing expansion and building joints with larger deformations must not be closed with a force fit. Such joints are to be drawn into the covering and, depending on the owner's requirements, formed with suitable profiles or with elastic grouting.

Cavities / holes

Holes and depressions larger than 10 mm must be levelled out with the base and levelling mortar **KLB-SYSTEM PU-BETON 4045** before applying the **KLB-SYSTEM PU-BETON 4006, 4009 or 4011 Grip** coverings. This can also be done with e.g. **KLB-SYSTEM PU-BETON 4012 Standfest** or **KLB-SYSTEM PU-BETON 4006**.

Roughness depths / unevenness

Roughness depths greater than 2 mm must be levelled out with the base and levelling mortar **KLB-SYSTEM PU-BETON 4045** before applying the covering. This is done on weak and absorbent substrates after applying **KLB-SYSTEM PU-BETON 4050 Grundierung**, but also directly on low absorbent substrates.

Anchoring cuts / grooves

As **KLB-SYSTEM PU-BETON** is subject to high expansion due to thermal loads, anchoring cuts / grooves must be carried out, e.g. at end edges, passages, rising components, gutters, inlets, built-ins, walls, etc. to anchor the coating system. These should be approx. 6 - 10 mm deep and approx. 6 - 8 mm wide. The anchoring cuts need to be made all around the room and the built-in components. The distance must always be kept small, approx. 5 to max. 10 cm or less at the walls; approx. 2 - 5 cm even smaller at inlets and gutters.



If possible, the corners of the cuts should be rounded (radius approx. 50 mm or larger) so that the angles do not create any tension. Since coatings tend to follow the floor level, an improvement in the evenness of the substrate cannot be achieved using **KLB-SYSTEM PU-BETON** systems.

Depending on the thickness of the system, the grooves may become visible in the surface. Therefore, the permissible tolerance according to DIN 18202 Table 3, line 3 or 4 must be maintained already before coating within the required limit ranges.

Structural and subsurface joints

In the case of subsequently formed joints, e.g. covings, gutters, inlets, gratings, pillars, pedestals, plinths, etc. in areas with high thermal or mechanical load exposure, an additional elastic joint grouting should be done, e.g. using **KLB-SYSTEM POLYURETHAN PU 465 / 465 LQ**.

If **PU-CONCRETE** is applied directly to metal components, it can crack at the corners due to the temperature load. It is recommended to avoid angular inlets, as notch stresses may occur in these cases. Some examples:

- transitions between different substrates (e.g. mortared gutter or inlet to existing concrete floor).
- areas with changing thermal loads (e.g. dishwasher, discharge of hot, saturated steam)

- surfaces around ovens or cold rooms
- maintenance joints made with elastic joint material should be checked or renewed periodically; at least an annual inspection is recommended.

Formation of inlets and gutters

Inlets should generally be installed in a round shape, as when being angular, they are exposed to high tension under temperature loads, which then lead to notch cracks. Inlets and gutters need to be force-fitted with mineral or synthetic resin mortar. The correct height must be ensured.



7. Installation information

7.1 Climatic conditions

Floor and air temperature must be between 15 °C - 25 °C / 59 °F - 77 °F and relative humidity should be at 40 to 85%.

The difference in floor and room temperature must remain less than 3 °C / 3 K / 5.4 °F so that curing will not be disturbed by moisture. If a dew-point situation arises, regular curing may be disrupted with hardening problems and spotting to occur. The temperature must be kept constant during installation and curing. Water exposure should be avoided during the first 24 hours. The specified hardening times apply for 20 °C / 68 °F. Lower temperature and air humidity may increase; higher temperature or air humidity may decrease the curing and processing times. If working conditions are not complied with, the technical properties of the end product may deviate from the description. Resin materials must be brought to the working temperatures in the room before application.

7.2 Mixing area

Mixing should be done as close as possible to the surface to be coated. The mixing station itself needs to be well organised to allow for an orderly workflow. The area where mixing takes place should be protected with fleece; if necessary also the main walkways, so that the substrate is not wetted or soiled with unmixed material. If resin is nevertheless spilled, the contamination must be removed immediately, as this can lead to adhesion problems or bubble formation on the surface to be coated.

Before mixing, the coating material must be prepared in the correct containers to avoid mix-ups. Since the processing times are short due to the system, the mixtures are to be processed without further delay after they have been completely blended. For this purpose, mixing, material transport and processing must be well organised and sufficient personnel made available.

The cleanliness of the tools and the workplace must be ensured during the entire installation.

7. Installation information

7.3 Planning the installation

Before starting the application of our **KLB-SYSTEM PU-BETON** systems, the following measures should be taken and observed:

- Division of work areas – They should correspond to the material quantity and be clearly marked. The processing width must not exceed 7 m, as otherwise roller marks cannot be avoided and the floor appearance is impaired.
- If it is not possible to lay the entire surface in one go and this takes longer than a day, an anchor cut must be made at the beginning of the last field.
- This must be repeated before continuing the installation.
- If work is interrupted, the construction joints need to be clearly marked (with non-absorbent materials, e.g. an aluminum lath wrapped in plastic foil).
- If feasible, the joints should be planned for in such a way that they can be hidden later, e.g. by placing machines on them. Please consult the responsible planner on this.

7.4 Mixing

The coating materials already weighed out in our factory are to be mixed according to the instructions in the respective product data sheets. Please ensure that only **complete** packaging units are processed. If a component is omitted and/or a different mixing ratio is used, this will lead to useless results and the technical properties of the end product may deviate from the description!

Possible consequences of mixing errors are:

- poor distribution of the reactive components, thus curing problems
- trowel marks or spiky appearance
- pinholes, bubbles or pores arising in the floor covering
- wavy surface or differences in colour tone

7.5 Storage of the material

Store in dry and always at frost-free conditions. Ideal storage temperature is between 15 - 20 °C / 59 - 68 °F. Bring to a suitable working temperature before application. Recommended minimum is 15 °C / 59 °F to maximum 25 °C / 77 °F. Optimum processing temperatures are between 18 - 22 °C / 64.4 - 71.6 °F.

7.6 Area output

For the following data, we assume an experienced team of 5 installers for an 8-hour day under optimal conditions (climate, experience of the employees, suitable tools, etc.). Area size 500 m².

- **KLB-SYSTEM PU-BETON 4050 Grundierung**
80 - 100 m²/h per installer
- **KLB-SYSTEM PU-BETON 4012 Standfest** (coving)
12 - 15 m/h per installer
- **KLB-SYSTEM PU-BETON 4006 / 4009**
40 - 50 m²/h with 5 installers
- **KLB-SYSTEM PU-BETON 4080 Kopfsiegel**
80 - 100 m²/h with 3 installers

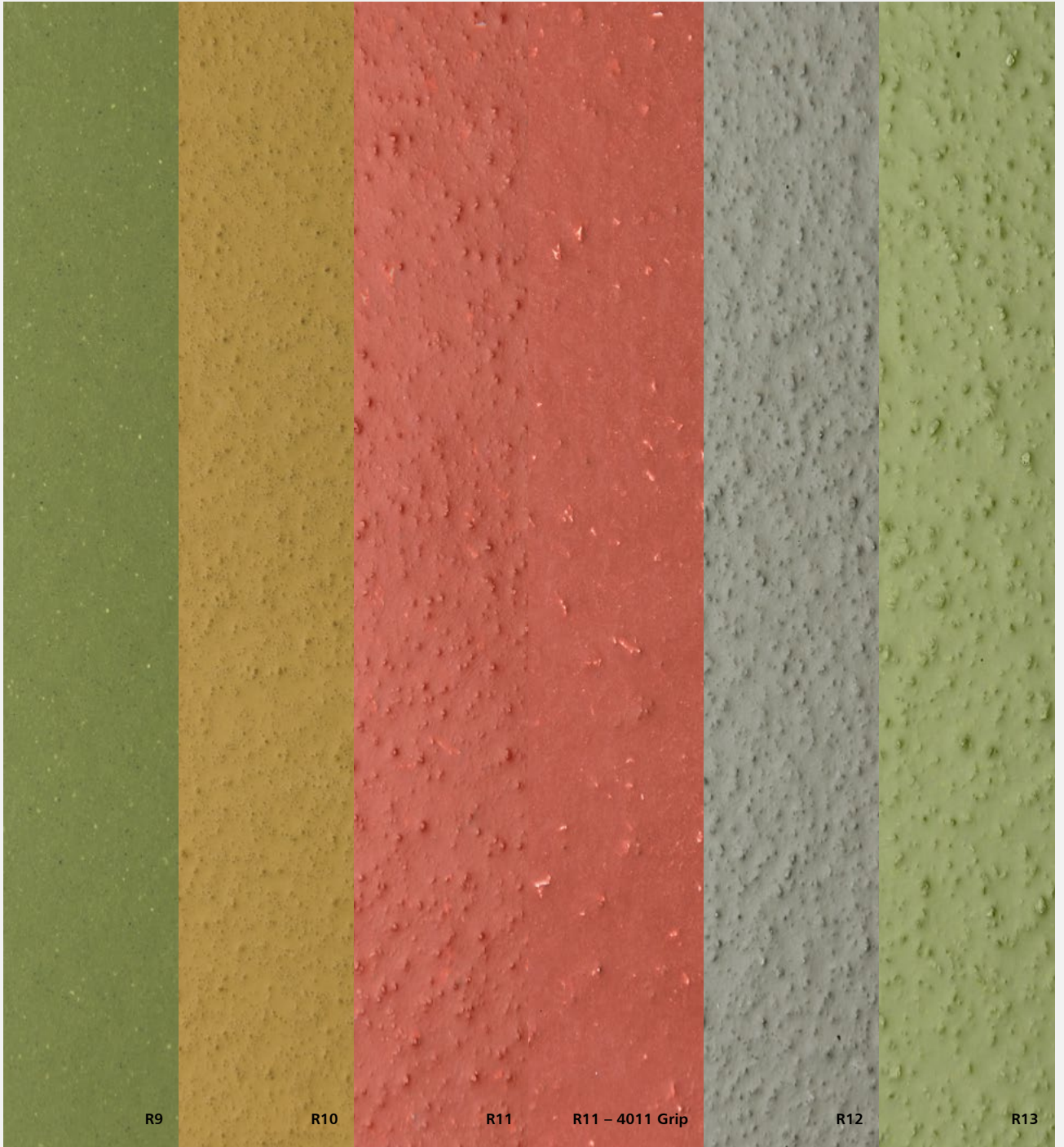
Time must also be allowed for setting up the mixing station and preparing the installation. In addition, the laying capacity depends on the structural conditions on site. The more corners and rising building components the surface to be coated has, the lower the area output and the more time and personnel are required.

7.7 Test certificates

The following external test certificates are available:

- Classification of the fire behaviour according to DIN EN 13501-01:2010-01: Bfl-s1
- Slip resistance grade R11, R12/V6, R13/V4, R13/V6 possible, according to DIN 51130 and BGR 181
- Slip resistance grade R9 possible; also in R10 in combination with **KLB-SYSTEM PU-BETON 4080 Kopfversiegelung**, according to DIN 51130 and BGR 181
- Suitable for use in foodstuffs according to § 31 para. 1, German Food and Feed Code (German law LFGB)
- Bacteriostatic activity according to ISO 22196:2011-08 and JIS 2801:2000

These can be requested from KLB Kötztal Lacke + Beschichtungen GmbH as proof or, if required, for presentation to the project planner / building owner. Please ask for the tested system build-up.



R9

R10

R11

R11 - 4011 Grip

R12

R13

8. Slip-resistance

Industrial floors not only have to meet chemical and mechanical requirements: it is also important that workplace safety and sufficient slip resistance are provided for the respective area of use.

These are regulated by the Professional Association for Occupational Safety and Health (German BGR).

BGR 181 / DGUV Rule 108-003 – Floor coverings in workrooms and areas with slippery conditions or risk of slipping, defines the requirements for slip resistance. Point 1 – Scope of application – specifies the conditions under which the Statutory Accident Insurance rule applies (German GUV, “Gesetzliche Unfallversicherung”): *when “selecting suitable floor coverings – designing floors and implementing organisational measures.”*

"It is limited to those workrooms, work areas and company traffic routes in which, due to their use or internal processes, the floors come into contact with slippery substances that pose a risk of slipping."

This GUV rule does not apply to floors in workrooms, work areas and company traffic routes that are dry and where there is no slip danger from substances that promote slipping."

A certain degree of non-slip properties is defined for different areas of application. Examples for slip resistance and displacement space can be found in Annex 1 of BGR 181. **KLB-SYSTEM PU-BETON** can be used to produce anti-slip coverings with various slip resistance classes.

The following slip resistance levels are available:

Evaluation based on test certificate	Build-up – Covering (system)
R9	KLB-SYSTEM PU-BETON 4006 KLB-SYSTEM PU-BETON 4009
R10	KLB-SYSTEM PU-BETON 4006 with 4080 Kopfsiegel KLB-SYSTEM PU-BETON 4009 with 4080 Kopfsiegel
R11	KLB-SYSTEM PU-BETON 4006 with NQS 0.3/0.8 mm and 4080 Kopfsiegel KLB-SYSTEM PU-BETON 4009 with NQS 0.3/0.8 mm and 4080 Kopfsiegel
R11	KLB-SYSTEM PU-BETON 4011 Grip
R12	KLB-SYSTEM PU-BETON 4006 with corundum 0.5/1.0 mm and 4080 Kopfsiegel KLB-SYSTEM PU-BETON 4009 with corundum 0.5/1.0 mm and 4080 Kopfsiegel
R13	KLB-SYSTEM PU-BETON 4006 with corundum 0.7/1.2 mm and 4080 Kopfsiegel KLB-SYSTEM PU-BETON 4009 with corundum 0.7/1.2 mm and 4080 Kopfsiegel

KLB-SYSTEM PU-BETON 4006 / PU-BETON 4009

in slip-resistance grades R9 to R13

9. Exemplary build-up of coats

Application of primer PU-BETON 4050 (smooth substrate)

- Saturated and pore-free primer **PU-BETON 4050 Grundierung**, consumption approx. 0.4 - 0.5 kg/m². No sanding!
- Use the specially stable **PU-BETON 4012 Standfest** for triangular or concave coverings. For a side length or radius of 5 cm: consumption approx. 2.2 - 2.8 kg per running meter. Also suitable for filling larger holes or local separations.
- If necessary: larger uneven areas may be filled or levelled with **PU-BETON 4045**.
- Apply **PU-BETON 4006** with a pin screed scraper in layers of approx. 6 mm, or **PU-BETON 4009** in layers of approx. 9 mm. Vent with a spiked roller.
- Slip-resistance: scatter completely with fire-dried corundum or quartz sand of the grain sizes 0.3/0.8 mm or 0.7/1.2 mm. After curing, sweep off and vacuum thoroughly until no more sand is released.
- Apply **PU-BETON 4080 Kopfsiegel** with a rubber squeegee and roll with a velours roller in crosswise motion. Consumption approx. 0.650 - 0.900 kg/m². Work fast and seamless.

When choosing a slip-resistant coating, a compromise must always be found between the necessary degree of slip resistance and cleanability. Smooth coverings are easier to clean than those with higher slip resistance. As a general rule, the higher the slip resistance, the greater the cleaning effort.

Application of PU-BETON 4045; 3-component polyurethane concrete base and levelling mortar

- Prepare the substrate by sand-blasting or milling.
- If necessary: fill holes or damaged areas with **PU-BETON 4045**.
- Apply **PU-BETON 4045** using a smoothing trowel, consumption 4 - 16 kg/m² depending on the desired slip-resistance.
- Use the specially stable **PU-BETON 4012 Standfest** for triangular or concave coverings. For a side length or radius of 5 cm: consumption approx. 2.2 - 2.8 kg per running meter. Also suitable for filling larger holes.
- Apply **PU-BETON 4006** with a pin screed scraper in layers of approx. 6 mm, or **PU-BETON 4009** in layers of approx. 9 mm. Vent with a spiked roller.
- Slip-resistance: scatter completely with fire-dried corundum or quartz sand of the grain sizes 0.3/0.8 mm or 0.7/1.2 mm. After curing, sweep off and vacuum thoroughly until no more sand is released.
- Apply **PU-BETON 4080 Kopfsiegel** with a rubber squeegee and roll with a velours roller in crosswise motion. Consumption approx. 0.650 - 0.900 kg/m². Work fast and seamless.

Anti-slip floors require cleaning with suitable automatic machines. The detergents used and the footwear must be adapted to the floor.

Top sealer

KLB-SYSTEM PU-BETON 4080 or
KLB-SYSTEM PU-BETON 4080 Clean

Base layer **KLB-SYSTEM PU-BETON 4006** or
KLB-SYSTEM PU-BETON 4009 and
subsequent scattering with corundum 0.5/1.0 mm, or
KLB-SYSTEM PU-BETON 4011 Grip
(without any further layers)

Scratch coat

KLB-SYSTEM PU-BETON 4006
or for levelling
KLB-SYSTEM PU-BETON 4045

Primer

KLB-SYSTEM PU-BETON 4050

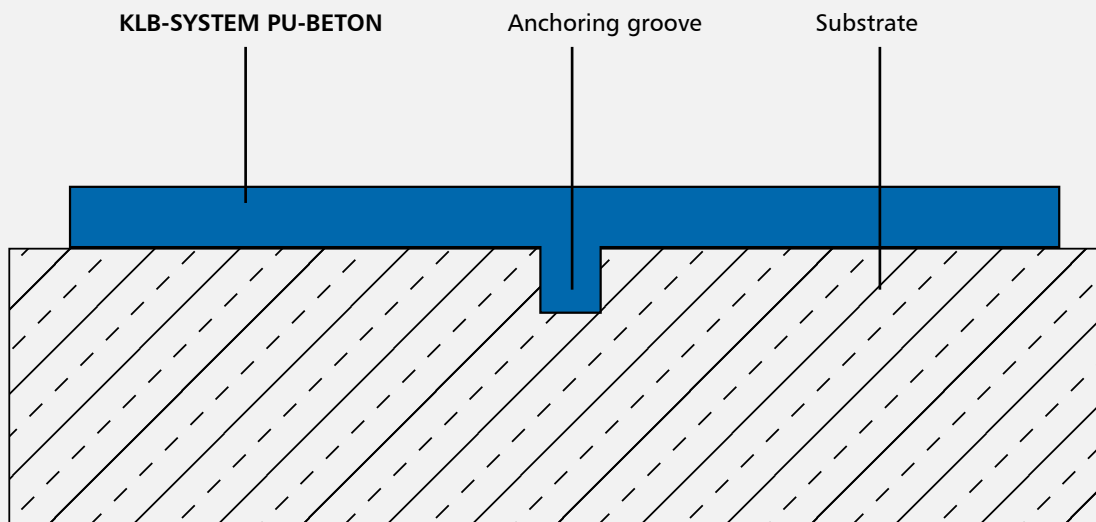
Screed **CT-C35-F5-V60**
or concrete **C25/30**

It is mandatory to stay within the recommended consumption for the slip resistance grade! Please observe the product information!

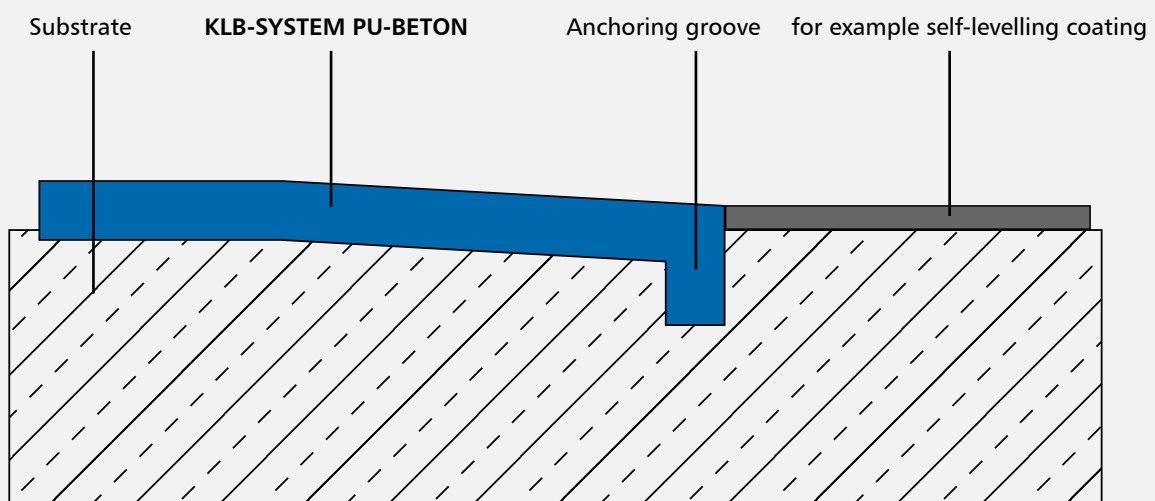
Please contact the Technical Sales Service of KLB Kötztal Lacke + Beschichtungen GmbH for further information.

10. Detail drawings

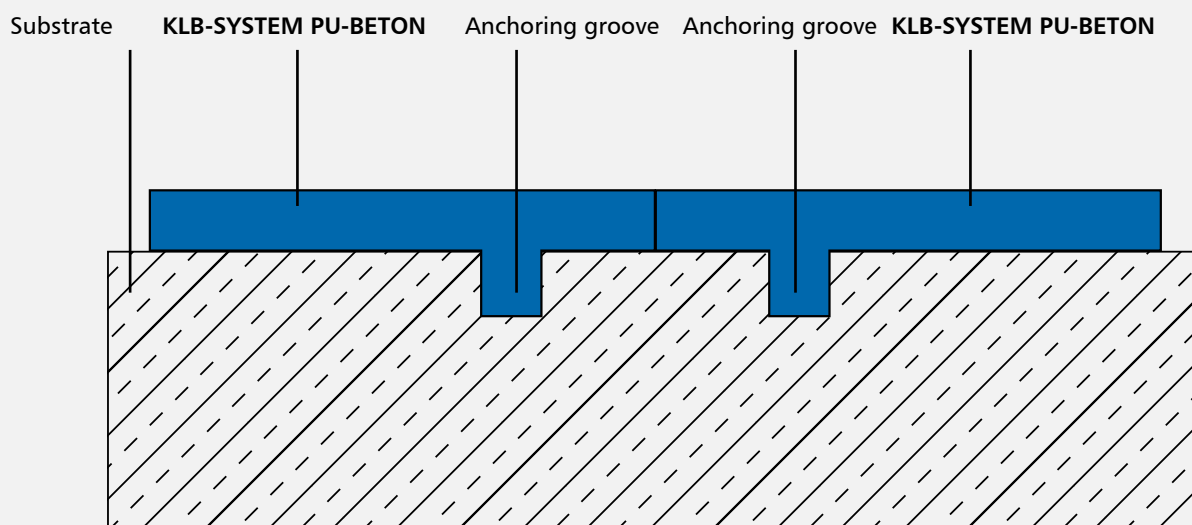
Application on an even subfloor, PU-CONCRETE covering with anchoring groove



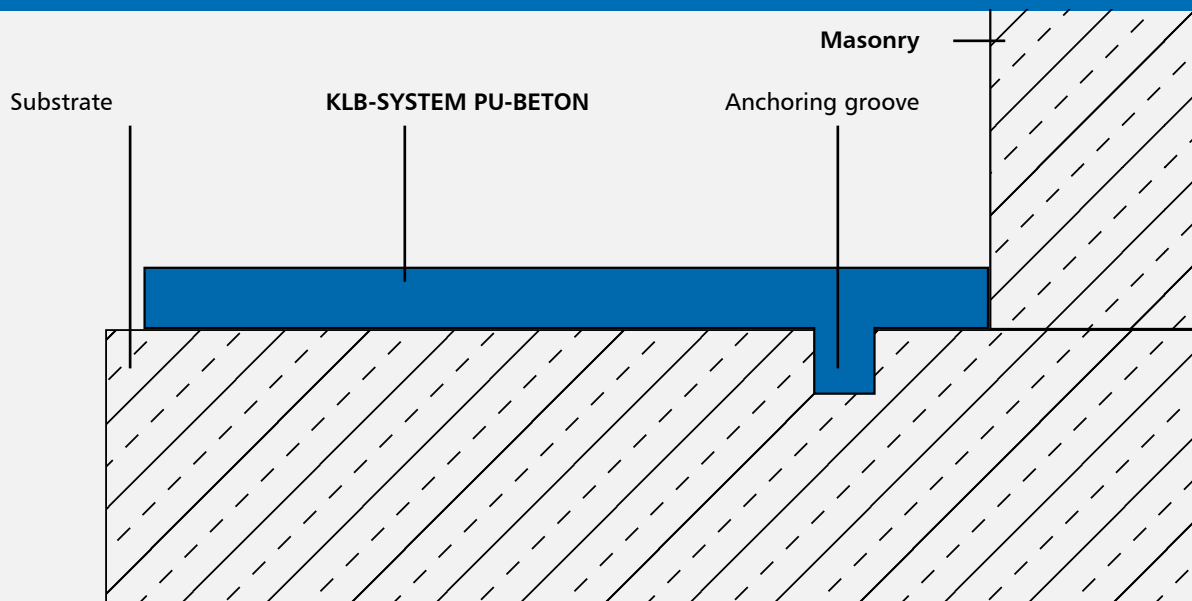
Application with level transition, at different floor heights



Construction joint with application onto an existing system

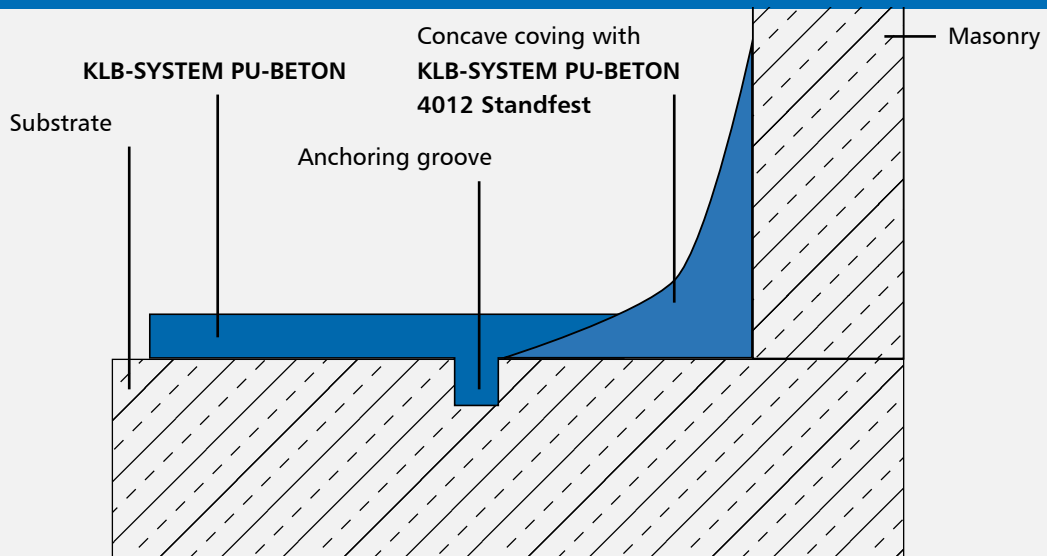


Wall connection without coving

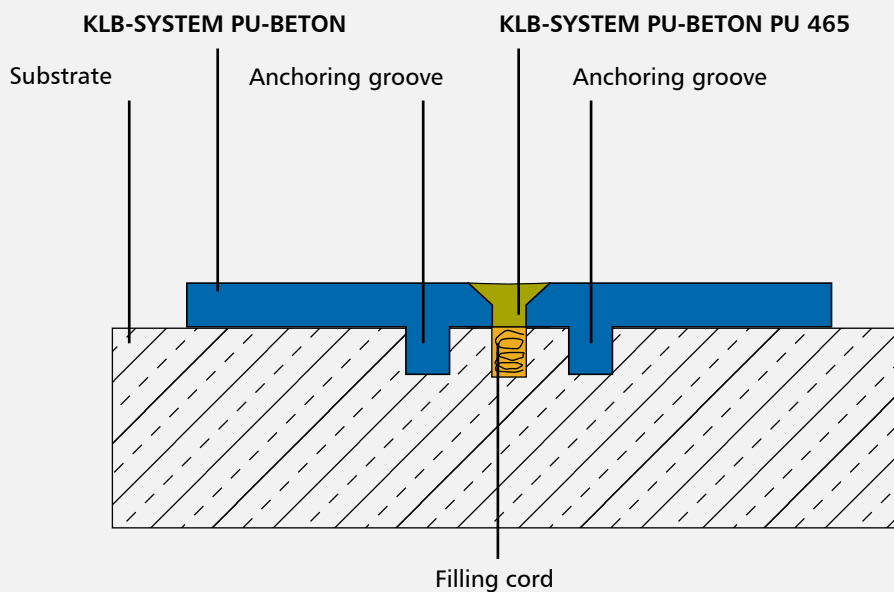


10. Detail drawings

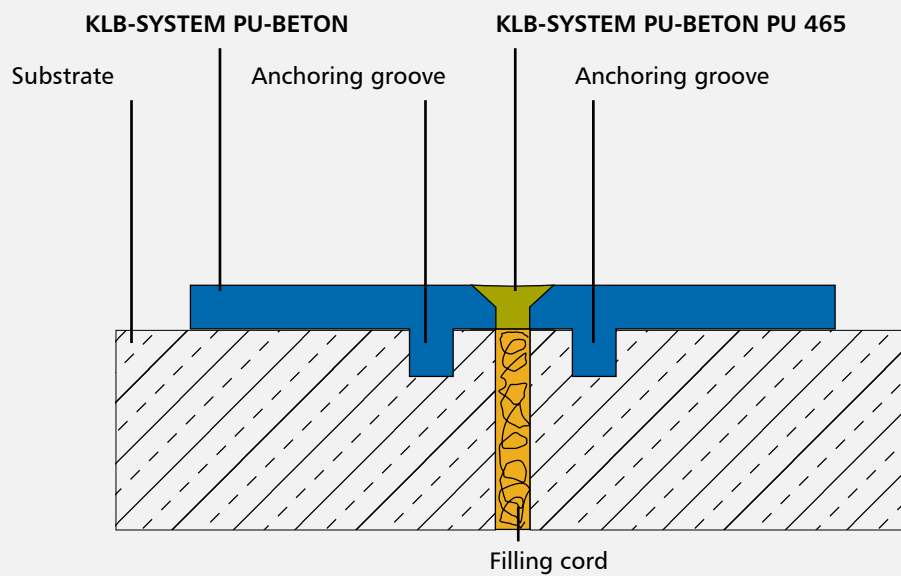
Wall connection with coving



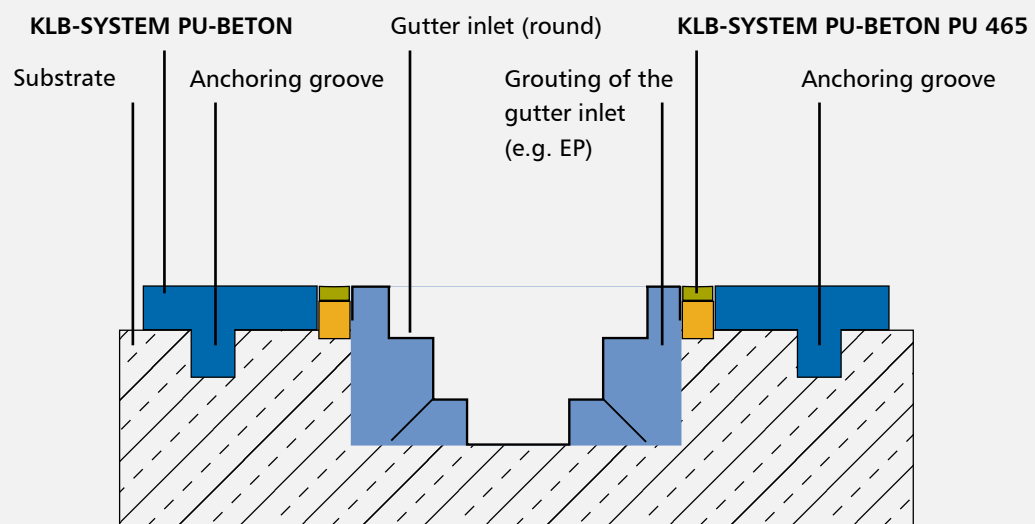
Forming a dummy joint



Forming an expansion joint



Forming an expansion joint



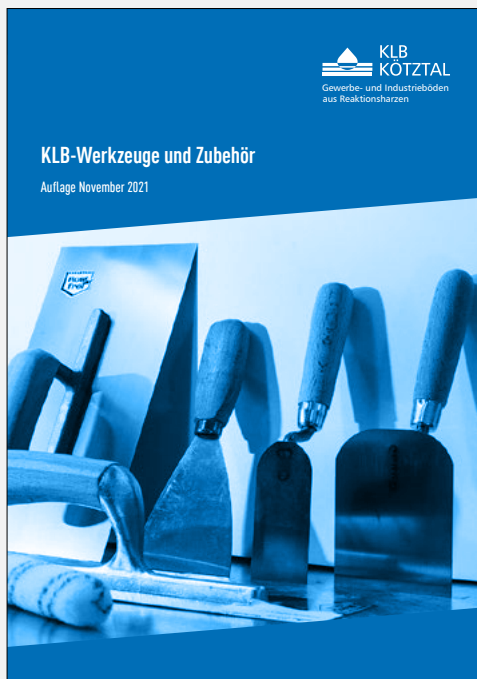
Forming a gutter inlet (round)

11. Tools and how to clean them

Required tools

- spiked roller for **PU-BETON**
spike length 35 mm
- trowel for the application of
KLB-SYSTEM PU-BETON
- pin screed scraper with adjustable
height, width 40 - 60 cm
- screed scraper (pin screed scraper)
height adjustable, width 40 or 60 cm

You can find suitable tools for the **KLB-SYSTEM PU-BETON** coatings in our tool catalogue:



Required equipment

- agitator for binders, slow-running
approx. 300 - 400 rpm, e.g.
 - Collomix CX10 agitator
with agitator basket WK 120
 - Bosch agitator 900W / 230V,
400UpM GRW9
 - Eibenstock agitator 1100W
EHR 20/2.4
- groove cutter for anchoring grooves
- compulsory mixer with timer,
e.g. Collomix XM3-900

Cleaning of tools

To remove fresh contamination and to clean tools or equipment, use **VR 28** or **VR 33** immediately after use. Hardened material can only be removed mechanically.



12. Care and maintenance

Cleaning

As **PU-CONCRETE** is resistant to temperature, hot water and chemicals, it is mainly used in areas of food production and processing. Hygiene and cleanliness are of particular importance in these industries. Floors in contact with food are exposed to frequent and intensive cleaning with automatic cleaning machines, high-pressure cleaners, etc. Depending on the requirements, neutral, alkaline, acidic or even disinfecting detergents are used. Cleaning is often clearly specified, e.g. by an HACCP hygiene management system.

According to REGULATION (EC) No 852/2004, any manufacturer who produces, processes or places food on the market is obliged to introduce a hygiene management system in accordance with the HACCP principles. HACCP (Hazard Analysis and Critical Control Point) is a management tool to ensure food safety.

It defines the concepts, procedures, products and frequency of cleaning.

Due to their good resistance to many chemicals, the cleaning agents used are generally suitable, as also proven by the Polymer Institute's test for application in the food industry in accordance with Regulation (EC) 852/2004.

As a rule, the cleaning products should only be used in the recommended, diluted dosage and rinsed well after cleaning. Acidic and also disinfectant cleaners or other special detergents can attack the surface if the dosage is too high, and lead to stains, discolouration, fading or whitening, etc.

Cleaning with high-pressure cleaners is possible in principle. However, too high pressure and temperatures can still damage the surface of the covering. If cleaning is to be carried out with high-pressure equipment, we recommend working with minimum pressure and at a temperature of no more than 50 °C / 122 °F. To ensure that the flooring can withstand the equipment settings, we recommend carrying out a test cleaning.

We will be happy to assist you in evaluating your cleaning agents and the procedure to be used. In this case, please send us product and safety data sheets as well as a the respective cleaning instruction.

Repairing damaged surfaces

Cut into the damaged area with a diamond cutting disc at an angle of 45° and remove it with a suitable tool.

- Make anchoring cuts (6 - 10 mm deep and wide) in the subfloor along the edges of the removed covering.
- Remove loose, friable parts and all separating substances without leaving any residue.
- To avoid contamination, cover the intact surface.

Rebuild the defective area according to the build-up of the products used.





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