Construction

Sikafloor®-21PurCem®

Medium to heavy duty self-smoothing polyurethane screed

Product Description

Sikafloor®-21 PurCem® is a multi-component, medium to high strength coloured polyurethane modified, cement and aggregate screed with self-smoothing properties.

It has an aesthetic, easy to clean, smooth textured aggregate surface providing medium slip resistance and is typically installed at 4.5 to 6 mm thick.

Uses

In areas of medium to heavy loading, abrasion and high chemical exposure, to provide a smooth, flat wearing surface, in process areas such as in:

- Food processing plants, in wet or dry process areas, freezers and coolers, thermal shock areas
- Chemical plants
- Laboratories
- Workshops
- Suitable for concrete protection providing physical resistance (Principle 5, method 5.1 of EN 1504-9)
- Suitable for concrete protection providing chemical resistance (Principle 6, method 6.1 of EN 1504-9)

Characteristics / Advantages

- Excellent chemical resistance. Resists a wide range of organic and inorganic acids, alkalis, amines, salts and solvents. Please refer to the Chemical Resistance Chart or consult your local Technical Dept.
- Similar coefficient of thermal expansion to concrete, allowing movement with the substrate through normal thermal cycling. It will perform and retain its physical characteristics through a wide temperature range from -40ºC (-40ºF) up to 90ºC (194ºF)
- Bond strength in excess of the tensile strength of concrete. Concrete will fail first
- Non taint, odourless
- VOC free
- High mechanical resistance.
- High abrasion resistance resulting from its silica aggregate structure
- It is possible to apply on to 7 to 10 day old concrete after adequate preparation and with a tensile bond strength in excess of 1.5 MPa (218 psi)
- Seamless, no additional expansion joints are necessary; simply maintain and extend existing expansion joints up through the Sikafloor®-PurCem® flooring system
- Easy to maintain
- Wide range of application temperatures +10 ºC - +40 ºC

Environmental Information

USGBC LEED® Rating	Conforms Section EQ (Indoor Environmental Quality), Credit 4.2 Low-Emitting Materials Paints and Coatings Calculated VOC content ≤ 50 g / l
Specific Characteristics	Low TVOC emissions, as tested externally at Eurofins, according to AgBB guidelines, test report nº G10004B .
Approval / Standards	Polyurethane screed for concrete protection according to the requirements of EN 1504-2:2004 and conforms to the requirements of EN 13813: 2002, DoP 02 08 02 02 001 0 000002 1088, certified by Factory Production Control Body, 0086, certificate 541325, and provided with the CE-mark. Concerning contact with foodstuffs, it conforms to the requirements of: - EN1186, EN 13130, and prCEN/TS 14234 standards, and the Decree on Consumer Goods, representing the conversion of directives 89/109/EEC, 90/128/EEC and 2002/72/EC for contact with food stuffs, according to test report by ISEGA, 32758 U11 and 32759 U11, both dated December 6th, 2011. (Tests performed on Sikafloor® -20/21/22/29 and 31 PurCem® in standard and LP versions) - Compliant with USDA flooring requirements - Canadian Food Inspection Agency acceptance for use in food plants in Canada. - British Standards Specifications (BSS) acceptance for use in the UK. Campden and Chorleywood Food Research Association, Ref. S/REP/125424/1a and 2a, dated 8th February, 2012 Fire classification report according to EN 13501-1 from Exova Warrington Fire for Sikafloor®-21 PurCem® No.317047, dated 24th of March, 2012 Liquid water transmission rate test report from the Technology Centre, Ref. 15456 dated January 25th, 2012 Abrasion resistance tests performed by Face Consultants Ltd., according to BS 8204-2:2003, report ref. FC/12/3850, dated January 17th, 2012. (Tests performed on Sikafloor® -20/21 PurCem®) Impact resistance values tested at PRA, Ref. nº 75221-151, dated January 11th, 2012 Slip resistance properties according to DIN 51130 tested at MPI (Materialprüfung und Entwicklung), test reports refs. Nº 12-6639-S/12 and 12-6641-S/12, dated August 7th, 2012. Thermal expansion coefficient and freeze-thaw cycle resistance performed at RWTH / IBAC, report nº M-1614 dated May 29th, 2012. All other values indicated are internal test results.

Product Data

Form

Appearance / Colours	Part A pre-tinted:	coloured liquid	Part A neutral	light beige liquid
	Part B:	brown liquid		
	Part C:	natural grey powder		
	Part D:	colourpack as per list below for part A neutral		

Available colours:

Beige
Maize Yellow
Oxide Red
Sky Blue
Grass Green
Pebble Grey
Light Grey
Dusty Grey
Agate Grey

Packaging	Part A+B+C:	21.0 kg ready to mix units (or A neutral+B+C+D)
	Part A pre-tinted:	3.00 kg plastic drum
	Part A neutral:	2.615 kg plastic drum
	Part B:	3.00 kg plastic jerrycan
	Part C:	15.00 kg plastic lined, double paper bags
	Part D:	0.385 kg plastic pouch for substrate A neutral

Storage

Storage Conditions / Shelf-Life	If stored properly in original, unopened and undamaged sealed packaging, in dry conditions at temperatures between +10°C and +25°C.	
	Part A:	12 months from date of production. **Protect from freezing**.
	Part B:	12 months from date of production. **Protect from freezing**
	Part C:	6 months from date of production. **Protect against humidity**.
	Part D:	24 months from date of production. **Protect from freezing**

Technical Data

Chemical Base	Polyurethane Cement		
Density	Part A pre-tinted:	~ 1.07 kg/l (at +20°C)	(EN ISO 2811-1)
	Part A_n neutral	~ 1.05 kg/l (at +20°C)	& (ASTM C 905)
	Part B:	~ 1.24 kg/l (at +20°C)	
	Part C:	~ 1.48 kg/l (at +20°C)	
	Part D	~ 1.45 – 1.50 kg/l (at +20ºC) – depending on the colour	
	Part A+B+C mixed:	~ 1.93 kg/l ± 0.03 (at +20°C) (or Aneutral+B+C+D)	
Layer Thickness	4.5 mm min. / 6 mm max. (including scratchcoat)		

Mechanical / Physical Properties

Capillary Absorption / Liquid water transmission rate	Permeability to water: <0.009 kg /m^2 $h^{0.5}$ Class Low (Average of three values, of Sikafloor® -21 PurCem®)	(EN 1062-3)
Thermal Expansion Coefficient	$\alpha \approx 4.4 \times 10^{-5}$ per °C (temperature range: -20°C to +40°C)	EN 1770
Water Absorption	<0.2%	(ASTM C 413)
Permeability	To Water Vapour: 0.115 g/h/m^2 (4.8 mm)	(ASTM E-96)
Fire Rating	Class $B_{(fl)}$ S1	(BS EN 13501-1)
Service Temperature	The product is suitable for use when exposed to continuous temperatures, wet or dry, of up to +90°C. The minimum service temperature is -40ºC at 6 mm and -20ºC at 4.5 mm.	
Compressive Strength	> 44 MPa after 28 days at +23°C / 50% r.h. > 50 N/mm^2 after 28 days at +23°C / 50% r.h.	(ASTM C 579) (BS EN 13892-2)
Flexural Strength	> 14.7 MPa after 28 days at +23°C / 50% r.h. >15 N/mm^2 after 28 days at +23°C / 50% r.h.	(ASTM C 580) (BS EN 13892-2)
Tensile Strength	9.1 N/mm^2	(EN ISO 527-2)
Bond Strength	> 2.5 N/mm^2 (failure in concrete) (1.5 N/mm^2 is the minimum pull off strength of the recommended concrete substrate)	(EN 1542)
Bond Strength after Thermal Shock Resistance Test	4.41 ± 0.34 N/mm^2	(EN 1542)
Shore D Hardness	80 - 85	(ASTM D 2240)
Flexural Modulus	3720 ± 431 MPa	
		(ASTM C 580)

Coefficient of Friction

Steel: 0.3
Rubber: 0.5

(ASTM D 1894-61T)

Slip Resistance

Slip Resistance Values (EN 13036- 4)

Substrate	SRV Dry	SRV Wet
Sikafloor®-21 PurCem®	70	60

TRRL Pendulum, Rapra 4S Slider

Slip resistance DIN 51130

	Av. Accp. Angle	Av. Displac area	R value	V value
Sikafloor®-21 PurCem®	11.1º	Not tested	R10	n/a

Abrasion Resistance

Class “Special” Severe abrasion resistance (BS 8204 Part 2)
AR 0.5 (EN 13892-4)
(Less than 0.05 mm wear depth)

861 mg (ASTM D 4060-01 - EN ISO 5470-1)
Taber Abrader H-22 wheel / 1000 gr / 1000 cycles

Class A6 (EN 13892-3)
4.58 $cm^3/50cm^2$

Indentation

≈ 0% (MIL - PFR 24613)

Impact Resistance

Class III (≥ 20 Nm) BS EN ISO 6272-1

2 pounds / 30 inches (3 mm thick) (ASTM D 2794)

Resistance

Chemical Resistance

Resistant to many chemicals. Please ask for a detailed chemical resistance chart.

Thermal Resistance

Exposure*	4,5 mm	6 mm
Permanent	-20°C to 70°C	-40°C to 90°C
thermal shock	---	70°C

Resistance to Thermal Shock

Pass (ASTM C 884)
No cracks and/or delamination
Sikafloor® -21 PurCem® can be subject to thermal shock up to 70ºC at 6 mm

Softening Point

>140ºC (284ºF) (ASTM D-1525 ISO 306 Method B)

System Information

System Structure

Standard System Build-up:

- Scratchcoat Sikafloor®- 21 PurCem®
- Bodycoat Sikafloor® - 21 PurCem®

Alternative System Build-up:

- Primer with Sikafloor®- 155WN, -156, -160, -161
  Fully blinded with quartzsand 0.4 – 0.7 mm
- Bodycoat Sikafloor® - 21 PurCem®

Application Details

Consumption / Dosage	*For primers, see respective PDS)* *Scratch coat:* Sikafloor®-21PurCem® (part A+B+C or A neutral+B+C+D) ~ 3 kg/m^2 for a 1.5 mm layer. *Self-smoothing screed:* Sikafloor®-21PurCem® (part A+B+C *or A neutral+B+C+D*) ~ 1.9 kg/m^2 / mm layer thickness.
Substrate Quality	The concrete substrate must be sound and of sufficient compressive strength (minimum 25 N/mm^2) with a minimum pull off strength of 1.5 N/mm^2. The substrate must be clean, dry or saturated surface dry (SSD) and free of all contaminants such as oil, grease, coatings and surface treatments, etc. If in doubt, apply a test area first. Sikafloor® PurCem® can be applied onto recent concrete over 7 to 10 days old or onto old damp concrete (SSD), as long as the substrate fulfils the above requirements.
Substrate Preparation	Refer to the Sikafloor®- PurCem® Information Manual

Application Conditions / Limitations

Substrate Temperature	+10°C min. / +40ºC max
Ambient Temperature	+10°C min. / +40ºC max
Substrate Humidity	Check absence of rising moisture (according ASTM D 4263 Polyethylene sheet test) and/or standing water
Relative Air Humidity	85% max.
Dew Point	Beware of condensation! The substrate and uncured floor must be at least 3°C above dew point to reduce the risk of condensation or blooming on the floor finish.

Application Instructions

Mixing	Part A : B : C = 1 : 1 : 5 (packaging size = 3.0 : 3.0 : 15) by weight Part A neutral : B : C : D = 0.87 : 1 : 5 : 0.13 (packaging size = 2.615 : 3.0 : 15 : 0.385) by weight **Mix full units only.**
Mixing Time	Refer to the Sikafloor®- PurCem® Information Manual Material and ambient temperature will affect the mixing process. If necessary, condition the materials for best use to 15ºC – 21ºC Premix part A with a low speed electric stirrer and then add part B and mix for 30 seconds. Make sure all pigment is uniformly distributed. For the colourpack version, premix part A neutral with a low speed electric stirrer and add part D to it. Mix until a uniform colour is achieved. Add part B and mix for 30 seconds. Make sure all pigment is uniformly distributed. Use a double paddle (axis) mixer and gradually add part C (aggregate) to the mixed resin. DON'T DUMP! Allow part C to blend for further 2 minutes minimum, to ensure complete mixing and a uniform moist mix is obtained. During the operations, scrape down the sides and bottom of the container with a flat or straight edge trowel at least once (parts A+B+C) to ensure complete mixing. **Mix full units only.**

Mixing Tools

Use a low speed electric stirrer (300 - 400 rpm) for mixing parts A and B.
For preparation of the mortar mix use a double paddle mixer.

For best results, always use clean containers to prepare the mix. Thus you will avoid contamination with already hardened material or shortened pot life due to accelerated setting caused by the increased temperature of the mix.

Application Method / Tools

Prior to application, confirm substrate moisture content, r.h. and dew point.

Priming of concrete substrates is usually not required under typical circumstances. (See Substrate Quality), but given the thinness and fluidity of Sikafloor® -21 PurCem® a scratch coat or primer layer is highly recommended.

- **Scratch coat.**
Mix and apply a scratch coat of Sikafloor®-21 PurCem® using steel trowels to spread the materials to approximately 1.5 mm thickness, (approximately 2.9 kg/m^2). This application will seal the concrete surface, fill the surface irregularities including pock marks, non-moving control joints and cracks. Allow overnight cure (24 hours at +20ºC) before application of the body coat.
In case of very absorbent substrates, a second scratch coat may be required.

- or priming

Sikafloor®-155W N, Sikafloor® -156, -161, lightly broadcast with quartz sand 0.4 – 0.7 mm. Prime retaining grooves but do not fill, increase size and depth by min 2.0mm.

Body coat.
Pour the mixed Sikafloor®-21 PurCem® onto the substrate and work with a toothed trowel or pin screed to the desired thickness, achieving a flat surface. A straight edge trowel can also be used to smooth out the marks of the tooth trowel or instead of it. Take care to spread newly placed materials across the transition of previously applied mixes before the surface begins to set. Remove air with a spike roller immediately (less than two minutes after placing). Roller spikes must be at least three times longer than the product thickness applied.

For a better surface finish use a combination of plastic spiked roller to remove trowel/spreader marks followed immediately by fine metal spiked roller.

To avoid retaining groove lines showing in the surface finish, prefill with Sikafloor®-21 PurCem® and allow to harden before applying bodycoat. Alternatively fill during scratch coat application

Allow a minimum 14 hour cure period at 20ºC before light traffic.

Cleaning of Tools

Clean all tools and application equipment with Thinner C immediately after use. Hardened / cured material can only be mechanically removed.

Potlife

Temperature	Time
+10°C	~ 35 - 40 minutes
+20°C	~ 22 - 25 minutes
+30°C	~ 15 – 18 minutes
+35ºC	~ 12 - 15 minutes

Waiting Time / Overcoating

If you have primed, before applying Sikafloor®-21 PurCem® on Sikafloor®-155W N, -156, -161 (broadcast with quartz sand) allow:

	Waiting time	
Substrate temperature	Minimum	Maximum
+10°C	24 hours	12 days
+20°C	12 hours	7 days
+30°C	6 hours	4 days
+35°C	6 hours	4 days

Always make sure primer is fully cured before application.

For application of the body coat of Sikafloor®-21 PurCem® over the scratch coat allow:

	Waiting time	
Substrate temperature	Minimum	Maximum
+10°C	24 hours	72 hours
+20°C	24 hours	48 hours
+30°C	12 hours	24 hours
+35ºC	12 hours	24 hours

Note: Times are approximate and will be affected be changing ambient and substrate conditions, particularly temperature and relative humidity.

This table above applies also for application on to the patching mortar made by aggregate addition.

Notes on Application / Limitations

Do not apply to PCC (polymer modified cement mortars) that may expand due to moisture when sealed with an impervious resin.

Always ensure good ventilation when using Sikafloor®-21 PurCem® in a confined space, to prevent excessive ambient humidity.

After application, Sikafloor®-21 PurCem® must be protected from damp, condensation and direct water contact (rain) for 24 hours.

Do not apply to un-reinforced sand cement screeds, asphaltic or bituminous substrate, glazed tile or non-porous brick, tile and magnesite, copper, aluminium, soft wood or urethane composition, elastomeric membrane and fibre reinforced polyester (FRP) composites.

Protect the substrate during application from condensation from pipes or any overhead leaks.

Do not apply to cracked or unsound substrates.

Always allow a minimum of 48 hours after product application prior to placing into service in proximity with food stuffs.

Products of the Sikafloor® -PurCem® product range are subject to discolouration when exposed to UV radiation. Extend depends on colour. There are no measurable losses of any properties when this occurs and it is a purely aesthetical matter. Products can be used outside provided the change in appearance is acceptable by the customer.

Sikafloor® -21 PurCem® is not recommended for shock freezers (in spite of suitability for -40ºC service temperature)

In some slow curing conditions, soiling of the surface may occur when opened to foot traffic, even though mechanical properties have been achieved. It is advised to remove dirt using a dry mop or cloth. Avoid scrubbing with water for the first 3 days.

Due to the technology used, colour stability of the products cannot be guaranteed when exposed to UV light.

Curing Details

Applied Product ready for use

Sikafloor®-21 PurCem®

Substrate temperature	Foot traffic	Light traffic	Full cure
+10°C	~ 20 hours	~ 34 hours	~ 7 days
+20°C	~ 12 hours	~ 16 hours	~ 4 days
+30°C	~ 8 hours	~ 14 hours	~ 3 - 4 days
+35ºC	~ 8 hours	~ 14 hours	~ 3 - 4 days

Note: Times are approximate and will be affected by changing ambient and substrate conditions.

Cleaning / Maintenance

Methods

Refer to the method statement Sikafloor®- Cleaning Regime with cleaning agents from Diversey Care™

Value Base	All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.
Local Restrictions	Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.
Health and Safety Information	For information and advice on the safe handling, storage and disposal of chemical products, users should refer to the most recent Material Safety Data Sheet containing physical, ecological, toxicological and other safety-related data.

Construction

Legal Notes	The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.
EU Regulation 2004/42 VOC - Decopaint Directive	According to the EU-Directive 2004/42, the maximum allowed content of VOC Product category IIA / **j** type **wb**) is140 g/l (Limit 2010), for the ready to use product. **Sikafloor®-21 PurCem**, is VOC free for the ready to use product.

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