



Sikafloor®-235 ESD

2-part epoxy electrostatic, dissipative and tough elastic self-smoothing system

Construction

Product Description

Sikafloor®-235 ESD is a 2-part, tough elastic self-smoothing, coloured epoxy resin coating. "Total solid epoxy composition acc. to the test method Deutsche Bauchemie e.V. (German Association for construction chemicals)"

Uses

- Decorative and protective dissipative self-smoothing system for concrete or cement screeds with normal up to medium heavy wear.
- Particularly suitable for areas with requirements for a low electrostatic charge (Body-voltage) and dissipative surface.
- Typical applications include industries that process, assemble, install, package, test or transport, such as clean room, pharmaceutical, automotive industries etc.

Characteristics / Advantages

- Body voltage generation < 30 V *
- Good mechanical and chemical resistance
- Easy application
- Easy to clean and liquid proof
- In accordance with general ESD requirements
- Fulfils ESD-requirements at > 25 % RH/+23°C**

Tests

Approval Standards

Self-smoothing, coloured epoxy resin coating according to EN 1504-2: 2004 and EN 13813, DoP 02 08 01 02 037 0 000005 2017, certified by Factory Production Control Body No. 0921, certificate 2017, and provided with the CE-mark.

* Testing of electrostatic properties in accordance to IEC 61340-5-1, Polymer Institute, Test Report P 4956-1-E, November 2007

** Testing of electrostatic properties in accordance to IEC 61340-5-1, SP Institute, Test Report F900355:B, February 2009

Conforms to the requirements of ANSI/ESD S20.20-2007 and IEC 61340-5-1. (Internal Test)

Fire classification in accordance with EN 13501-1, Report-No. 2007-B-0181/18, MPA Dresden, Germany, May 2007.

Particle emission certificate Sikafloor-235 ESD CSM Statement of Qualification - ISO 14644-1, class 4 - Report No. SI 0706-406 and GMP class A, Report No. SI1008-533.

Outgassing emission certificate Sikafloor-235 ESD: CSM Statement of Qualification - ISO 14644-8, class -6.8 - Report No. SI 0706-406.

Biological Resistance in accordance with ISO 846, CSM Report No. SI 1008-533



Testing of Paint Compatibility in acc. to BMW-Standard 09-09-132-5, Polymer Institute, Test Report P 5541, August 2008

Varnishability test according to Mercedes Benz-standard PBODC380/PBVCE380 (paint wetting impairment substances (PWIS)) like silicones, Test Report VPT-Nr. 07LL165, 04.2008.

Product Data

Form

Appearance / Colours Resin - part A: coloured, liquid
Hardener - part B: transparent, liquid
Almost unlimited choice of colour shades.
Due to the nature of carbon fibres providing the conductivity, it is not possible to achieve exact colour matching. With very bright colours (such as yellow and orange), this effect is increased. Under direct sun light there may be some variations and colour variation, this has no influence on the function and performance of the coating.

Packaging Part A: 19.5 kg
Part B: 5.5 kg
Part A+B: 25 kg (part A+B) ready to mix units

Storage Conditions / Shelf Life 12 months from date of production if stored properly in original, unopened and undamaged sealed packaging in dry conditions at temperatures between +5°C and +30°C.

Technical Data

Chemical Base EP

Density Part A: ~ 1.69 kg/l
Part B: ~ 1.03 kg/l (DIN EN ISO 2811-1)
Mixed Resin: ~ 1.49 kg/l
All Density values at +23°C.

Solid Content ~ 100% (by volume) / ~ 100% (by weight)

Electrostatic Behaviour Resistance to ground¹⁾: $R_g < 10^9 \Omega$ (IEC 61340-4-1)
Typical average resistance to ground²⁾: $R_g < 10^6 \Omega$ (DIN EN 1081)
Body voltage generation²⁾: < 100 V (IEC 61340-4-5)
System Resistance (Person/Floor/Shoe)³⁾: < 35 M Ω (IEC 61340-4-5)

¹⁾ In accordance with IEC 61340-5-1 and ANSI/ESD S20.20.

²⁾ Readings may vary, depending on ambient conditions (i.e. temperature, humidity) and measurement equipment.

³⁾ Or < $10^3 \Omega$ + body voltage generation of < 100 V, in case of readings > 35 M Ω .

USGBC Sikafloor®-235 ESD conforms to the requirements of LEED

LEED Rating EQ Credit 4.2: Low-Emitting Materials: Paints & Coatings

SCAQMD Method 304-91 VOC Content < 100 g/l

Mechanical / Physical Properties

Compressive Strength Resin: ~ 44 N/mm² (28 days / +23°C) (EN 196-1)

Flexural Strength Resin: ~ 20 N/mm² (28 days / +23°C) (EN 196-1)

Bond strength > 1.5 N/mm² (failure in concrete) (ISO 4624)

Shore D Hardness 58 (7 days / +23°C) (DIN 53 505)

Abrasion Resistance 60 mg (CS 10/1000/1000) (28 days / +23°C) (DIN 53109 Taber Abraser Test)

Resistance

Chemical Resistance Resistant to many chemicals. Please ask for a detailed chemical resistance table.

Thermal Resistance

Thermal Resistance

Exposure*	Dry heat
Permanent	+50°C
Short-term max. 7 d	+80°C

Short-term moist/wet heat* up to +80°C where exposure is only occasional (i.e. during steam cleaning etc.)

*No simultaneous chemical and mechanical exposure.

System Information

System Structure

Self-smoothing system ca. 1.0 - 1.5 mm – semi-gloss finish:

Primer: 1 x Sikafloor®-156 / -161
 Earthing connection: Sikafloor® Earthing Kit
 Conductive primer: 1 x Sikafloor®-220 W Conductive
 Conductive screed: 1 x Sikafloor®-235 ESD, filled with Sikafloor®-Filler 1

Note: alternatively quartz sand F34* can be used as a filler, which will result in a gloss finish with a slight change of the aesthetical appearance.

Textured coating:

Primer: 1 x Sikafloor®-156 / -161
 Earthing connection: Sikafloor® Earthing Kit
 Conductive primer: 1 x Sikafloor®-220 W Conductive
 Wearing course: 1 x Sikafloor®-235 ESD mixed with Extender T

Note: The system configurations as described must be fully complied with and may not be changed. Due to the nature of carbon fibres providing the conductivity, surface irregularities might be possible. This has no influence on the function and performance of the coating. Do not use Sikafloor®-230 ESD TopCoat to overcoat Sikafloor®-235 ESD.

Application Details

Consumption / Dosage

Coating System	Product	Consumption
Primer	Sikafloor®-156 / -161	0.3 - 0.5 kg/m ²
Levelling (optional)	Sikafloor®-156 / -161 mortar	Refer to PDS of Sikafloor®-156 / -161
Conductive primer	Sikafloor®-220 W Conductive	0.08 - 0.10 kg/m ²
Self-smoothing wearing course for high aesthetical demands	Sikafloor®-235 ESD filled with Sikafloor®-Filler 1*	Maximum 2.5 kg/m ² binder + Sikafloor®-Filler 1* ca. 1.0 mm film thickness: 1:0.2 pbw (~ 1.3 + 0.3 kg/m ²) ca. 1.5 mm film thickness: Depending on the temperature the filling grade varies from: 1 : 0.1 pbw (2.3 + 0.2 kg/m ²) to 1 : 0.2 pbw (2.1 + 0.4 kg/m ²)
Self-smoothing wearing course (Film thickness ~ 1.5 mm)	1 pbw Sikafloor®-235 ESD filled with quartz sand F34*	Maximum 2.5 kg/m ² Binder + quartz sand F34* Depending on the temperature the filling grade varies from: 1 : 0.1 pbw (2.3 + 0.2 kg/m ²) to 1 : 0.3 pbw (1.9 + 0.6 kg/m ²)
Textured coating (Film thickness ~ 0.5 mm)	Sikafloor®-235 ESD + Extender T + Thinner C	0.7 - 0.8 kg/m ² 1.5 - 2% (by weight) 1.5 - 2% (by weight)

These figures are theoretical and do not allow for any additional material due to surface porosity, surface profile, variations in level or wastage etc.

*All values have been determined using quartz sand 0.1-0.3 mm from Quarzwerke GmbH Frechen and Sikafloor-Filler 1. Other quartz sand type will have an effect on the product, such as filling grade, levelling properties and aesthetics.

Generally, the lower the temperature the less the filling grade.

Substrate Quality

Concrete substrates must be sound and of sufficient compressive strength (minimum 25 N/mm²) with a minimum pull off strength of 1.5 N/mm².

The substrate must be clean, dry and free of all contaminants such as dirt, oil, grease, coatings and surface treatments, etc.

If in doubt, apply a test area first.

Substrate Preparation

Concrete substrates must be prepared mechanically using abrasive blast cleaning or scarifying equipment to remove cement laitance and achieve an open textured surface.

Weak concrete must be removed and surface defects such as blowholes and voids must be fully exposed.

Repairs to the substrate, filling of blowholes/voids and surface levelling can be carried out using appropriate products from the Sikafloor[®], SikaDur[®] and SikaGard[®] range of materials.

The concrete or screed substrate has to be primed or levelled in order to achieve an even surface. Unevenness will influence the film thickness and thus the conductivity.

High spots must be removed by e.g. grinding.

All dust, loose and friable material must be completely removed from all surfaces before application of the product, preferably by brush and/or vacuum.

Application Conditions / Limitations

Substrate Temperature +10°C min. / +30°C max.

Ambient Temperature +10°C min. / +30°C max.

Substrate Humidity < 4% pbw moisture content.

Test method: Sika-Tramex meter, CM-measurement or Oven-dry-method.

No rising moisture according to ASTM (Polyethylene-sheet).

Relative Air Humidity 80% r.h. 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 : part B = 78:22 (by weight)

Mixing Time Prior to mixing, stir part A mechanically. When all of part B has been added to part A, mix continuously for 2 minutes until a uniform mix has been achieved.

When parts A and B have been mixed, add the quartz sand F34 or Sikafloor[®]- Filler 1 and mix for a further 2 minutes until a uniform mix has been achieved.

To ensure thorough mixing pour materials into another container and mix again to achieve a consistent mix.

Over mixing must be avoided to reduce air entrainment.

Mixing Tools Sikafloor[®]-235 ESD must be thoroughly mixed using a low speed electric stirrer (300 - 400 rpm) or other suitable equipment.

Application Method / Tools Prior to application, confirm substrate moisture content, r.h. and dew point.

If > 4% pbw moisture content, Sikafloor[®] EpoCem[®] may be applied as a T.M.B. (temporary moisture barrier) system.

Levelling:

Rough surfaces need to be levelled first because varying thickness of the Sikafloor®-235 ESD wearing course will influence the conductivity and aesthetical appearance. Therefore use Sikafloor®-156 / -161 levelling mortar (see PDS).

Placing of earthing points:

See below “Notes on Application / Limits”.

Application of Sikafloor® conductive primer:

See PDS of Sikafloor®-220 W Conductive.

Wearing course smooth:

Sikafloor®-235 ESD is poured, spread evenly by means of a serrated trowel. Roll immediately in two directions with spiked roller to ensure even thickness.

After spreading the material evenly, turn the serrated trowel and smooth the surface in order to achieve an aesthetically higher grade of finish.

Wearing course textured:

Sikafloor®-235 ESD (unfilled) is applied with a serrated trowel and then back-rolled (crosswise) with a textured roller.

Cleaning of Tools

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

Potlife

Temperature	Time
+10°C	~ 40 minutes
+20°C	~ 25 minutes
+30°C	~ 15 minutes

Waiting Time / Overcoatability

Before applying Sikafloor®-235 ESD on Sikafloor®-220 W Conductive allow:

Substrate temperature	Minimum	Maximum
+10°C	26 hours	7 days
+20°C	17 hours	5 days
+30°C	12 hours	4 days

Times are approximate and will be affected by changing ambient conditions particularly temperature and relative humidity.

Notes on Application / Limitations

This product may only be used by experienced professionals. Do not apply Sikafloor®-235 ESD on substrates in which significant vapour pressure may occur.

Do not blind the primer.

Freshly applied Sikafloor®-235 ESD must be protected from damp, condensation and water for at least 24 hours.

Only start application of Sikafloor® conductive primer after the priming coat has dried tack-free all over. Otherwise there is a risk of wrinkling or impairing of the conductive properties.

Maximum layer thickness of wearing course: ~ 1.5 mm.

Excessive thickness (more than 2.5 kg/m²) causes reduced conductivity.

Before the application of a conductive flooring system, a reference area has to be applied. This reference area must be assessed and accepted from the contractor/client. The desired result and method of conductivity measurement must be stated in the Specification and Method Statement. The number of conductivity measurements is strongly recommended to be as shown in the table below:

Ready applied area	Number of measurements
< 10 m ²	6 measurements
< 100 m ²	10-20 measurements
< 1000 m ²	50 measurements
< 5000 m ²	100 measurements

In case of values lower/higher as required, additional measurements has to be carried out, approx. 30 cm around the point with insufficient readings. If the newly measured values are in accordance with the requirements, the total area is acceptable.

Please note, that measuring results of the thixotropic version of Sikafloor®-235 ESD may vary due to a difference in surface profile.

Placing of earthing points:

Please make sure to only use the original Sikafloor® Earthing Kit in order to connect the earthing points. Every earthing point is able to conduct approx. 300 m². Ensure the longest distance of each point in the area is max. 10 m to the next earthing point. For longer distances, additional earthing points have to be placed. If site conditions do not allow placing of additional earthing points, longer distances (>10 m) have to be bridged with the help of copper tapes. The earthing points have to be connected to the ring-mains, which has to be carried out and approved by an electrical engineer and in accordance with any relevant regulations or standards.

Numbers of earth connections:

Per room at least 2 earthing points. The optimum number of earth connections depends on the local conditions and should be specified using available drawings.

Please note:

Sikafloor®-235 ESD is not suitable for permanent water load.

ESD clothing, ambient conditions, measurement equipment, cleanliness of the floor and the test person have a substantial influence on the measurement results.

All measurement values for Sikafloor®-235 ESD stated in the data sheet (apart from the ones referring to proof statements) were measured under the following conditions:

ESD-footwear by

using cotton socks:

The ESD-footwear must fulfil the requirements of DIN EN 61340-4-3 (Climate 2, resistance < 5 M Ohm).

Size of ESD-footwear:

42 (EU) (UK: 8; US: 8,5)

Weight of the test person:

90 kg

Ambient conditions:

+23°C/50% rel. air moisture

Measuring tool: Resistance to ground:

Insulation Tester
Metriso 2000 from Warmbier or comparable.

Surface resistance probe:

Carbon Rubber electrode. Weight: 2.50 kg (+/- 0.25 kg); Diameter: 65 mm (+/- 5 mm); Rubber pad hardness: Shore A 60 (+/- 10)

Measuring tool: System test:

Insulation Tester
Metriso 2000, Warmbier or comparable.

Measuring tool: Walking test:

Walking Test Kit WT 5000 from Warmbier or comparable.

Under certain conditions, underfloor heating combined with high point loading, may lead to imprints in the resin.

Due to the elasticity of Sikafloor®-235 ESD high point loads may lead to imprints.

If heating is required do not use gas, oil, paraffin or other fossil fuel heaters, these produce large quantities of both CO₂ and H₂O water vapour, which may adversely affect the finish. For heating use only electric powered warm air blower systems.

The incorrect assessment and treatment of cracks may lead to a reduced service life and reflective cracking - reducing or breaking conductivity.

For exact colour matching, ensure the Sikafloor®-235 ESD in each area is applied from the same control batch numbers.

Curing Details

Applied Product ready for use

Temperature	Foot traffic	Light traffic	Full cure
+10°C	~ 4 days	~ 8 days	~ 10 days
+20°C	~ 3 days	~ 6 days	~ 7 days
+30°C	~ 2 day	~ 5 days	~ 6 days

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

Cleaning / Maintenance

Methods

To maintain the appearance of the floor after application, Sikafloor®-235 ESD must have all spillages removed immediately and must be regularly cleaned using rotary brush, mechanical scrubbers, scrubber dryer, high pressure washer, wash and vacuum techniques etc. using suitable detergents and waxes..

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 shall refer to the most recent Material Safety Data Sheet containing physical, ecological, toxicological and other safety-related data.

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

According to the EU-Directive 2004/42, the maximum allowed content of VOC (Product category IIA / j type **sb**) is 500 g/l (Limits 2010) for the ready to use product.

VOC - Decopaint Directive

The maximum content of **Sikafloor®-235 ESD** is < 500 g/l VOC for the ready to use product.



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