

Conformal coatings of the series **ELPEGUARD**[®] SL 1307 FLZ/4

The 1-pack conformal coatings of the series **ELPEGUARD**[®] **SL 1307 FLZ/4** are used to protect and insulate assembled pcbs so that they can fulfil higher requirements regarding quality, reliability and service life. Owing to their very good resistance against moisture and condensation an excellent protection against corrosion (such as electro corrosion and migration) is possible.

The conformal coatings of the series **ELPEGUARD**[®] **SL 1307 FLZ/4** are distinguished by a very good adhesion even on critical substrates. Achieved through a chemical reaction with the substrate, the improved adhesion gives excellent results in the cross hatch test according to DIN EN ISO 2409 that is uncommon for conformal coatings.

- Base: modified acrylate resins
- colourless-transparent, fluorescent
- fast physical drying
- very good adhesion to critical substrates
- tested by Trace Laboratories East acc. to **IPC-CC-830B**, **MIL-I-46058C** and **IEC 61086-2** (class II for "high reliability")
- UL approval of SL 1307 FLZ/& as **Permanent Coating according to UL 94** and as **Conformal Coating according to UL 746E** (UL file no. E80315)
- can be soldered-through at soldering iron temperature for repair purposes or removed with the help of thinner **V 1307 FLZ/2** and reapplied after repair
- approved and in use at leading automotive suppliers
- suitable for flexible circuits ("flex-to-install", bend stress during assembly only)
- very good ageing and yellowing resistance
- very good TCT (thermal cycling test) resistance
- can be used in a temperature range of **-65 up to +125 °C** [-85 up to 257 °F]
- resistant in 4-part noxious gas test according to DIN EN 60068-2-60 or BMW GS 95003-4

Characteristics

	SL 1307 FLZ/184	SL 1307 FLZ/234
Colour/appearance	colourless-transparent, fluorescent	colourless-transparent, fluorescent
Solids content, DIN EN ISO 3251 1 h, 125 °C [257 °F], 1 g weighed quantity	23 ± 2 % by weight	27 ± 2 % by weight
Viscosity at 20 °C [68 °F], flow time acc. to DIN 53211, 4 mm DIN flow cup	18 ± 2 s	23 ± 2 s
Viscosity at 20 °C [68 °F], flow time acc. to DIN EN ISO 2431, 4 mm ISO flow cup	38 ± 6 s	60 ± 10 s
Density at 20 °C [68 °F], DIN EN ISO 2811-1	1.00 ± 0.02 g/cm ³	1.00 ± 0.02 g/cm ³

Indices: SL = conformal coating, FLZ = fluorescent, /184 = of the series /4 with a viscosity of 18 s acc. to DIN 53211, likewise /234

List of possible physical and mechanical properties

Lackwerke Peters largely verifies its own production range with regard to the products' physical and mechanical properties. Please note that the values may slightly vary depending on the adjustment.

Property	Test method	Result
Cross hatch	DIN EN ISO 2409 on copper on FR4 base material	Gt 0 Gt 0
Flexibility	IPC-CC-830B, 3.5.5	passed
Glass transition temperature Tg	thermo mechanical analysis (DMA)	approx. -4 °C [24.8°F]
Coefficient of thermal expansion (CTE)	thermo mechanical analysis (TMA)	160 ppm/°C ≤ RT

List of possible electrical properties

Lackwerke Peters largely verifies its own production range with regard to the products' electrical properties. Please note that the values may slightly vary depending on the adjustment. These values are reached after 7 days of storage at room temperature.

Property	Test method	Result
Dielectric strength	IPC-TM-650, 2.5.6.1 DIN EN 60243-1	100 kV/mm
	IPC-CC-830B, 3.6.1	passed
Specific volume resistivity	VDE 0303, part 30/DIN IEC 60093 IPC-TM-650, 2.5.17.1	6.4 x 10 ¹⁵ Ohm x cm
Surface resistance	VDE 0303, part 30/DIN IEC 60093 IPC-TM-650, 2.5.17.1	2.0 x 10 ¹⁴ Ohm
Moisture and insulation resistance	IPC-CC-830B, 3.7.1 (65 °C [149 °F]/90 % r. h.)	passed
	85/85 test; ramp formed storage at high air moisture and high tem- perature, amongst others 3 days at 85 °C [185 °F] and 85 % r.h.	1.0 x 10 ⁹ Ohm

Property	Test method	Result
Thermal shock	IPC-CC-830B, 3.7.2 -65 to +125 °C [- 85 °F to 257 °F]	passed
Hydrolytic stability	IPC-CC-830B, 3.7.3	passed
Comparative Tracking Index (CTI = tracking resistance)	DIN EN 60112 on FR4 base material with CTI 225	CTI > 600
Resistance to condensation	based on DIN EN ISO 6270-2 (BIAS 12 V, 40 °C [104 °F], 100% r.h.)	1.0 x 10 ⁹ Ohm
Dielectric constant ϵ_r	VDE 0303, part 4	50 Hz: 3.8 1 MHz: 3.2
Dielectric loss factor $\tan \delta$	VDE 0303, part 4	50 Hz: 0.052 1 MHz: 0.036
TI (temperature index)	DIN EN 60216 (IEC 60216) issue 2001	125 °C [257 °F] (20 000 h)* 150 °C [302 °F] (5 000 h)*

* can be used in a temperature range of **-65 up to at least + 125 °C** [-85 up to at least 257 °F]. Both at the lower and upper ends of this range the performance and reliability of the material can be negatively affected in some applications. In these cases, additional pre-trials and tests are required. Limit values for classification were a 25 % loss in mass and/or dielectric strength in comparison to the appropriate reference values.

Processing



Please read this technical report and the publications listed below carefully before using the product. These sheets are enclosed with the first shipment of product or sample

MSDS

The corresponding material safety data sheet contains detailed information and characteristics on safety precautions, environmental protection, transport, storage, handling and waste disposal.

AI

Application information AI 1/1 "Processing instructions for ELPEGUARD® conformal coatings (thin film coatings)"

TI

Technical information TI 15/3 "Protective measures when using chemicals including lacquers, casting compounds, thinners, cleaning agents"

The conformal coatings of the series **ELPEGUARD® SL 1307 FLZ/4** can be applied by automatic selective coating units, by brushing or spraying. When applied by dipping, this product must be handled under dry protective gas owing to its moisture sensitivity.



Protect against humidity

Before the coating process, either the (highly) thixotropic conformal coating **ELPEGUARD® SL 1307 FLZ-T** or the **SL 1307 FLZ-HT** can be applied for building dams around connectors, components and pads easily and precisely, in order to prevent the penetration or spreading of the subsequently applied conformal coating (dam and fill).

Since the many different permutations make it impossible to evaluate the whole spectrum (parameters, reactions with materials used, chemical processes and machines) of processes and subsequent processes in all their variations, the parameters we recommend are to be viewed as guidelines only that were determined in laboratory conditions. We advise you to determine the exact process limitations within your production environment, in particular as regards compatibility with your specific follow-up processes, in order to ensure a stable fabrication process and products of the highest possible quality.

The specified product data is based upon standard processing conditions/test conditions of the mentioned norms and must be verified observing suitable test conditions on processed printed circuit boards.

Feel free to contact our application technology department (ATD) if you have any questions or for a consultation.

Safety recommendations

- When using chemicals, the common precautions should be carefully noted.
- Ensure that extractor units of workplace ventilation arrangements are positioned at solvent source level.
- Please also pay attention to national guidelines or directives concerning operational safety such as the German TRBS (technical regulations for operational safety) and those concerning the handling of flammable liquids as for example the German TRbF (technical regulations for flammable liquids) or European directives.

Adjustment of viscosity

- Adjust the processing viscosity for each application process by means of thinner **V 1307 FLZ/2** (see also item 3.1 of the Application information sheet **AI 1/1** „Adjustment of the processing viscosity“).

DIL to be thinned with thinner V 1307 FLZ/2

On account of the special solvent composition processing temperatures of 20-35 °C [68-95 °F] are possible.

Auxiliary products recommended

- **Thinner V 1307 FLZ/2**
for removing the conformal coating within repair work
- **Reinigungsmittel R 5817**
for cleaning work place and tools

Double coating

The conformal coatings of the series **ELPEGUARD® SL 1307 FLZ/4** are suitable for double coating to a limited extent since they are dissolved by the solvent contained in the lacquer.

Drying/curing

Drying is finished after complete evaporation of the solvents.

- Observe the advice given in Section 7 of the **Application Information sheet AI 1/1** "Drying/Curing".

The drying parameters depend, among others, on the geometry of the assemblies, the population and ink layer thickness. In case of oven drying it depends on the oven loading etc. The following data serves as a guideline:

	At room temperature (ca. +23 °C [73.4°F])	in circulating hot air units
Drying (tack-free) based on DIN EN 60464 (IEC 60464)	20-30 min	—
Drying time until packaging	ca. 1.5 h	10–20 min at 80 °C [176 °F]

The maximum adhesion is achieved after 7 days of storage at room temperature; it is possible to accelerate the process by heat storage.

Standard packaging

	Packaging	Selling unit
SL 1307 FLZ/184 SL 1307 FLZ/234	Plastic can of 15 kg	15 kg
V 1307 FLZ/2	Plastic can of 15 kg	15 kg

Smaller packing units against surcharge.

Shelf life and storage conditions



Shelf life: In sealed original containers at least 4 months



Storage conditions: +5 °C to +25 °C [+41 °F to +77 °F]



Protect against humidity

For warehousing reasons, isolated cases may occur where the shelf life upon shipment is less than the shelf life indicated in this technical report. However, it is ensured that our products have **at least** two-thirds of their shelf life remaining when they leave our company. Labels on containers show shelf life and storage conditions.

Disclaimer

All descriptions and images of our goods and products contained in our technical literature, catalogues, flyers, circular letters, advertisements, price lists, websites, data sheets and brochures, and in particular the information given in this literature are non-binding unless expressly stated otherwise in the Agreement. This shall also include the property rights of third parties if applicable.

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Any questions?

We would be pleased to offer you advice and assistance in solving your problems. Free samples and technical literature are available upon request.

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