ELPEGUARD®
peters

TR TECHNICAL REPORT

Conformal coatings of the series ELPEGUARD® SL 1307 FLZ

The conformal coatings of the series **ELPEGUARD® SL 1307 FLZ** are used to protect and insulate electronic assemblies so that they can fulfil higher requirements regarding reliability and service life. Owing to their very good resistance against moisture and condensation an excellent protection against corrosion (such as electrochemical corrosion and migration) is possible.

- Base: acrylate resins (AR)
- fast physical drying
- SL 1307 FLZ/& tested by Trace Laboratories East according to **IPC-CC-830B** and **MIL-I-46058C**
- UL recognised component according to **UL 746E** (UL File No. E80315, SL 1307 FLZ/&)
- fulfils the requirements according to IEC 60664-3
- can be soldered-through at soldering iron temperature for repair purposes or completely removed with the help of the corresponding thinner (see item “Viscosity adjustment”) and reapplied after repair
- used by leading automotive suppliers
- very good ageing and yellowing resistance
- temperature range from -65 to at least +125 °C [-85 to at least +257 °F]
- very good TCT (thermal cycling test) resistance: -40 to +150 °C [-40 to 302 °F] or -65 to +125 °C [-85 to 257 °F] respectively
- resistant in 4-part noxious gas test according to DIN EN 60068-2-60 or BMW GS 95003-4 respectively
- best resistance class GX against noxious gases according to ISA 71.04-2013
- “ready-to-use” viscosity adjustments available for all common coating methods
- suitable for flexible circuit boards (“flex-to-install“, exposure to bend stress limited to the time of assembly)
- the adjustments free from fluorescent agents are particularly suitable for lighting electronics/LEDs
- when using the green or red adjustment the coating can be easily examined for completeness, thanks to the clear contrast with the substrate

LP 222911 E-7 / 301381e_000

Characteristics

	Colour/ appearance	**Solids content** DIN EN ISO 3251 1 h, 125 °C [257 °F], 1 g weighed quantity	**Viscosity at 20 °C (flow time)**		**Density** at 20 °C [68 °F] DIN EN ISO 2811-1
			DIN 53211 4 mm DIN flow cup	**DIN EN ISO 2431** ISO flow cup (diameter of nozzle given in brackets)	
SL 1307	colourless	31 ± 3 % by weight	60 ± 6 s	41 ± 4 s (6 mm)	0.96 ± 0.02 g/cm³
SL 1307 FLZ	colourless, fluorescent	30 ± 3 % by weight	55 ± 5 s	75 ± 7 s (5 mm)	0.96 ± 0.02 g/cm³
SL 1307 FLZ/18		22 ± 2 % by weight	18 ± 2 s	38 ± 4 s (4 mm)	0.94 ± 0.02 g/cm³
SL 1307 FLZ/21		24 ± 2 % by weight	21 ± 2 s	50 ± 5 s (4 mm)	0.95 ± 0.02 g/cm³
SL 1307 FLZ/23		25 ± 2 % by weight	23 ± 2 s	60 ± 5 s (4 mm)	0.95 ± 0.02 g/cm³
SL 1307 FLZ/25		27 ± 3 % by weight	25 ± 2 s	70 ± 7 s (4 mm)	0.95 ± 0.02 g/cm³
SL 1337	red	31 ± 3 % by weight	60 ± 6 s	41 ± 4 s (6 mm)	0.96 ± 0.02 g/cm³
SL 1367	green	31 ± 3 % by weight	60 ± 6 s	41 ± 4 s (6 mm)	0.96 ± 0.02 g/cm³

Indices: SL = conformal coating, FLZ = fluorescent, /18 = viscosity 18 s acc. To DIN 53 211, likewise /21, /23, /25

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**
Flexibility	IPC-CC-830B, 3.5.5	passed
Glass transition temperature Tg	DMA TMA	≈ -4 °C [24.8°F] ≈ 45 °C [113 °F]
Coefficient of thermal expansion (CTE)	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' storage at room temperature.

Property	**Test method**	**Result**
Dielectric strength	IPC-TM-650, 2.5.6.1	≥ 60 kV/mm
	IPC-CC-830B, 3.6.1	passed
Specific volume resistivity	DIN EN 62631-3-1	≥ 1.5 x 10^{15} Ohm x cm
Surface resistance	DIN EN 62631-3-2	≥ 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 (3 d, 85 °C [185 °F], 85 % R.H.)	≥ 1.0 x 10^{9} Ohm
Thermal shock	IPC-CC-830B, 3.7.2 -65 to +125 °C [-85 to +257 °F]	passed
Hydrolytic stability	IPC-CC-830B, 3.7.3	passed

Property	Test method	Result
Comparative Tracking Index (CTI, tracking resistance)	DIN EN 60112 on FR4 base material with CTI 275 CTI 600	 CTI ≥ 600 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^{10} Ohm
Salt spray test	BMW GS 95003-4	passed
Permittivity ε_r	VDE 0303, part 4	50 Hz: ≈ 3.8 1 MHz: ≈ 3.2
Dielectric loss factor tan δ	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** can be applied by dipping, brushing, spraying or by means of automatic selective coating units.

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 recommendation

➔ 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 operating safety such as the German TRBS (technical rules for operating safety) and those concerning the handling of flammable liquids or European directives.

Viscosity adjustment

➔ Adjust the processing viscosity for each application process by means of the appropriate thinner (see item “Adjustment of the processing viscosity” of the Application Information sheet **AI 1/1**).

	to be thinned with thinner V 1307:	SL 1307 SL 1337 SL 1367
DIL	to be thinned with thinner V 1307 FLZ:	SL 1307 FLZ SL 1307 FLZ/21 SL 1307 FLZ/23 SL 1307 FLZ/25
	to be thinned with thinner V 1307 FLZ-BA:	SL 1307 FLZ/18

Auxiliary products recommended

- **Thinners V 1307, V 1307 FLZ and V 1307 FLZ-BA**
  for removing the conformal coating within repair jobs (see item “Viscosity adjustment“)
- **ELPESPEC® cleaning agent R 5817**
  for the cleaning of work place and tools/equipment
- **ELPESPEC® cleaning agent R 5888**
  water-soluble, biodegradable cleaning agent for product carriers and tools

Double coating

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

Drying/curing

Drying is finished after complete evaporation of the solvents. 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 (approx. +23 °C [73.4 °F]	**In circulating hot air units**
Drying (tack-free) according to DIN EN 60464 (IEC 60464)	15-20 min	—
Drying time before packaging	approx. 1-2 h	5-20 min at 50-80 °C [122 to 176 °F]

Packaging

The packing units available are indicated in our offer which we will send you upon request.

Shelf life and storage conditions

Shelf life: In sealed original containers at least 18 months

Storage conditions: +5 °C to +35 °C [+41 °F to 95 °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.

The products are exclusively intended for the applications indicated in the corresponding technical data sheets. The advisory service does not exempt you from performing your own assessments, in particular as regards their suitability for the applications intended. The application, use and processing of our products and of the products manufactured by you based on the advice given by our Application Technology Department are beyond our control and thus entirely your responsibility. The sale of our products is effected in accordance with our current terms of sale and delivery.

Any questions? We would be pleased to offer you advice and assistance in solving your problems. Samples and technical literature are available upon request.

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