

# Conformal coatings of the series ELPEGUARD® SL 1400 ECO-FLZ

The conformal coatings of the series **ELPEGUARD® SL 1400 ECO-FLZ** are used to protect and insulate assembled pcbs 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 electro corrosion and migration) is possible.

These conformal coatings are particularly environment-friendly since they are totally free from aromatic solvents such as benzene, toluene, xylene and C9 aromatics.

- Base: polyurethane resins (UR)
- humidity curing
- UL approval of SL 1400 ECO-FLZ/& acc. to **UL 94** (UL file no. E80315)
- temperature range from **-65 to at least +140 °C** [-85 to at least 284 °F]
- outstanding chemical resistance similar to that of a 2-pack coating system
- excellent climatic protection when exposed to high temperature **and** air humidity
- "ready-to-use" viscosity adjustments for different coating methods
- suitable for coating flexible circuits ("flex-to-install", exposure to bend stress limited to time of assembly)
- can be soldered through or mechanically removed (blasting method) for repair purposes and reapplied after repair.

## Characteristics

	Colour/appearance	Solids content DIN EN ISO 3251, 1 h, 125 °C [257 °F] 1 g weighed qty.	Viscosity at 20 °C [68 °F] (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 in brackets)	
SL 1400 ECO-FLZ	colourless,	60 ± 3 % by weight	55 ± 5 s	75 ± 8 s (5 mm)	1.05 ± 0.05 g/cm³
SL 1400 ECO-FLZ/20	fluorescent	50 ± 2 % by weight	20 ± 2 s	46 ± 6 s (4 mm)	1.01 ± 0.05 g/cm³

Indices: SL = conformal coating, ECO = ecological, FLZ = fluorescent, /20 = viscosity of 20 s acc. to DIN 53211

## 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	TMA	Tg <sub>1</sub> < -40 °C [-40°F] Tg <sub>2</sub> ≈ 70 °C [158 °F]
Coefficient of thermal expansion (CTE)	TMA < 70 °C [158 °F] > 70 °C [158 °F]	≈ 130 ppm/°C ≈ 3000 ppm/°C

## 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 DIN EN 60243-1	80 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	1 x 10 <sup>14</sup> Ohm x cm
Surface resistance	VDE 0303, part 30/DIN IEC 60093 IPC-TM-650, 2.5.17.1	2 x 10 <sup>14</sup> 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, 85 % R. H.)	1 x 10 <sup>9</sup> Ohm
Thermal shock	IPC-CC-830B, 3.7.2 -65 to +125 °C [- 85 to 257 °F]	passed
Comparative tracking index (CTI, tracking resistance)	DIN EN 60112 on FR4 base material with CTI 275	CTI > 600
Resistance to condensation	based on DIN EN ISO 6270-2 (BIAS 12 V, 40 °C [104 °F], 100% R. H.)	1 x 10 <sup>10</sup> Ohm
TI (temperature index)	DIN EN 60216 (IEC 60216) issue 2001	140 °C [284 °F] (20 000 h)* 150 °C [302 °F] (5 000 h)*

\* can be used in a temperature range of **-65 up to at least +140 °C** [-85 up to at least 284 °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 the classification of the TI 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 1400 ECO-FLZ** can be applied by automatic selective coating units and brushing or spraying.



Protect against humidity

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

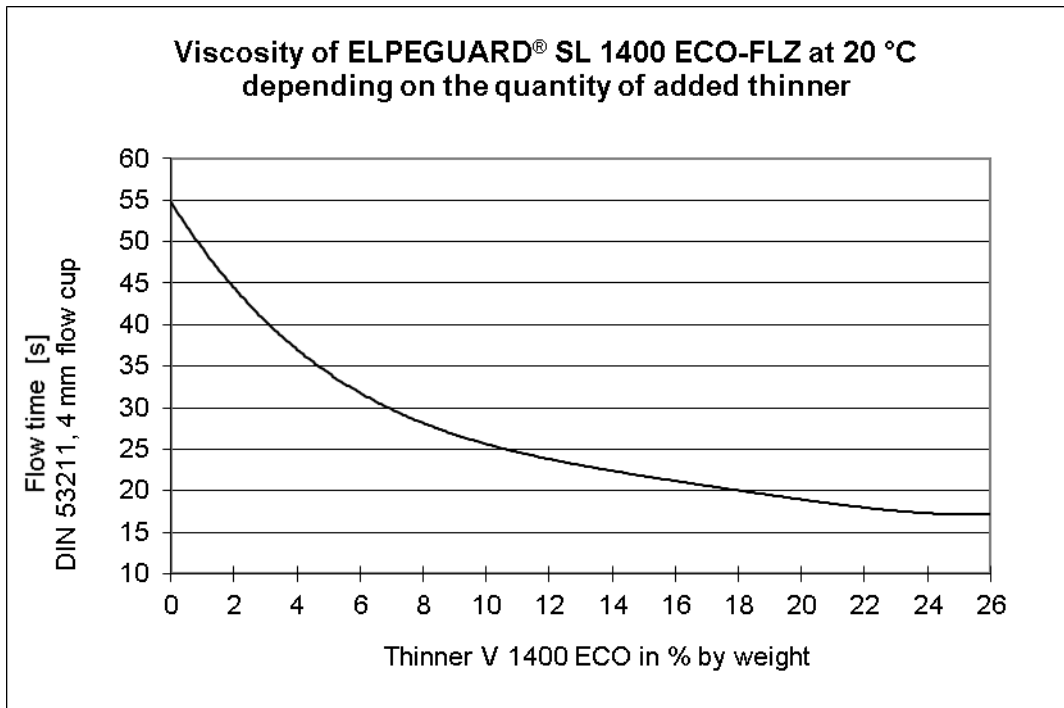
**There is the risk that filter mats in spraying cabins impregnated with coating and solvent residues, cleaning cloths or similar may ignite.**

- **Collect and keep soiled cleaning cloths etc. in tightly closing non-flammable containers; remove them from the operating room after the works have been completed.**
- **When applying coatings by means of compressed-air spraying, the safety precautions given in corresponding national regulations on explosion protection must be observed.**
- **When processing coatings by means of spraying it is mandatory to take protection measures in order to avoid the formation of solvent vapour mixtures that might explode.**
- **Use water-irrigated spraying cabins to avoid the risk of the filter mats self-igniting. Moreover, follow the operating and maintenance instructions of the spraying cabin / filter mat manufacturers.**

### Viscosity adjustment

- Adjust the processing viscosity according to the application method selected by adding thinner **V 1400 ECO** (see Application information sheet **AI 1/1**, item "Adjustment of the processing viscosity").

**DIL** To be diluted with thinner **V 1400 ECO**



### Auxiliary products recommended

- **Cleaning agent R 5804**  
for the cleaning of equipment and of opened containers' threads
- **Cleaning agent R 5817**  
for the cleaning of work place and tools/equipment
- **Thinner V 1400 ECO**  
for the cleaning of opened containers' threads

### Double coating

→ Follow the instructions of the Application information sheet **AI 1/1**, see item "Application of too high layer thicknesses/duplicate coating".

**Double coating** is possible if thick layers are required. For this purpose, it is essential that the second layer is applied only after the first layer has completely cured (humidity curing, approx. 48 to 96 h).

### Drying/curing

Drying/curing is completed in two steps: physical drying (evaporation of solvents) and humidity curing (reaction with air humidity).

→ Follow the instructions of the Application information sheet AI 1/1, see item "Drying/curing".

- **Physical drying**

The following data serves as a guideline for drying a wet film thickness of approx. 75 µm:

	<b>At room temperature (approx. +23 °C [73.4 °F])</b>
Drying (dust-dry)	approx. 40 min
Drying (tack-free) acc. to DIN EN 60464 (IEC 60464)	approx. 2-2.5 h

- **Humidity curing**

Humidity curing takes approx. 48 to 96 h and depends, besides other factors, on the component layout, the layer thickness applied and the air humidity.

For this product, oven curing is not recommended due to the fact that air humidity is required for curing. Thus one has to ensure that enough air humidity is present for curing.

→ Carry out pre-trials to define the optimum parameters for oven curing.

## Standard packaging

Can of 15 kg. Smaller quantities available against surcharge.

## Shelf life and storage conditions



Shelf life: In sealed original containers at least 6 months



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



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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. Samples and technical literature are available upon request.

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