ELPEGUARD®
peters

TR TECHNICAL REPORT

Conformal coatings of the series ELPEGUARD® SL 1306 N

The conformal coatings of the series **ELPEGUARD® SL 1306 N** 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: modified acrylate resins (AR)
- minimum odour during processing and after drying
- rapid drying
- UL approval acc. to UL 94: best flame class V-0 (UL file no. E80315)
- suitable for coating flexible circuits (”flex-to-install“, exposure to bend stress limited to time of assembly)
- very good ageing resistance
- temperature range from **-40 to +130 °C** [-49 to 266 °F]
- ”ready-to-use“ viscosity adjustments for different coating methods
- can be soldered through or mechanically removed (blasting method) for repair purposes and reapplied after repair.

Characteristics

	Colour/ appea-rance	**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 1306 N	colour-less	44 ± 2 % by weight	55 ± 5 s	75 ± 7 s (5 mm)	0.92 ± 0.02 g/cm³
SL 1306 N/23		37 ± 2 % by weight	23 ± 1 s	60 ± 5 s (4 mm)	0.89 ± 0.02 g/cm³
SL 1306 N/29		40 ± 2 % by weight	29 ± 1 s	34 ± 4 s (5 mm)	0.91 ± 0.02 g/cm³
SL 1306 N-FLZ	colour-less, fluores-cent	44 ± 2 % by weight	55 ± 5 s	75 ± 7 s (5 mm)	0.92 ± 0.02 g/cm³
SL 1306 N-FLZ/23		37 ± 2 % by weight	23 ± 1 s	60 ± 5 s (4 mm)	0.89 ± 0.02 g/cm³

Indices: SL = conformal coating, N = wetting agent, FLZ = fluorescent, /23 = viscosity 23 s per DIN 53 211, /29 respectively

LP 172211 E-7 / 300023e_000

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	Results
Flexibility	IPC-CC-830B, 3.5.5	passed
Glass transition temperature Tg	TMA	≈ 15 °C [59 °F]
Coefficient of thermal extension (CTE)	TMA	≈ 90 ppm/°C < Tg ≈ 780 ppm/°C > Tg

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 achieved after 6 h at 80 °C [176 °F], or after 14 days' storage at room temperature.

Property	Test method	Result
Dielectric strength	VDE 0303, part 21 DIN EN 60243-1	≥ 65 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	≥ 2 x 10^{14} Ohm x cm
Surface resistance	VDE 0303, part 30/DIN IEC 60093 IPC-TM-650, 2.5.17.1	≥ 2 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 temperature, amongst others 3 days at 85 °C [185 °F] and 85 % R.H.	≥ 4.8 x 10^{8} 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 base material with CTI 275	CTI > 600
Resistance to condensation	based on ISO 6270-2, (BIAS 12 V, 40 °C [104 °F], 100% R.H.)	≥ 1.2 x 10^{9} Ohm
Permittivity ε_r	DIN 53483 100 kHz 1 MHz	≈ 3.0 ≈ 3.2
Dielectric loss factor tan δ	DIN 53483 100 kHz 1 MHz	≈ 0.016 ≈ 0.013
TI (temperature index)	DIN EN 60216 (IEC 60216), issue 2001	≥ 130 °C [266 °F] (20 000 h)* ≥ 150 °C [302 °F] (5 000 h)*

* can be used in a temperature range from -**40 up to at least 130 °C** [-40 up to at least 266 °F]; a use down to -65 °C is possible. 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 1306 N** can be applied by dipping, brushing, or by means of automatic selective coating units.

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 if necessary while observing suitable test conditions on processed products.

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).

When oxidative curing coating systems cross-link with atmospheric oxygen, reaction heat is generated that may ignite cleaning cloths, filter mats in spraying cabins impregnated with coating and solvent residues, or similar.

→ **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 processing conformal coatings it is mandatory to observe the safety instructions of the corresponding national guidelines on explosion protection.**

→ **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 (see Application information sheet **AI 1/1**, item “Adjustment of the processing viscosity“).

DIL To be diluted with thinner **V 1306 N**

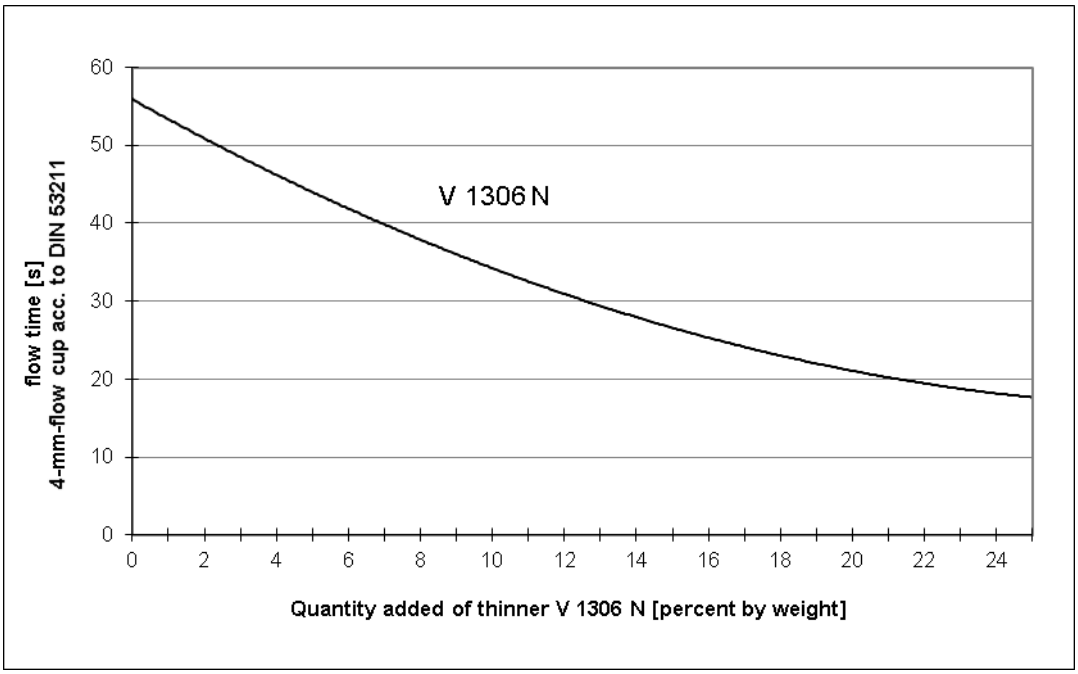

Fig. 1: Viscosity depending on the quantity of thinner added to conformal coating ELPEGUARD® SL 1306 N at 20 °C [68 °F]

Auxiliary product recommended

- Cleaning agent R 5817
  for the cleaning of work place and tools/equipment

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. In this case the second layer can be applied at any time after the first layer has dried.

Drying/curing

Drying/curing is completed in two steps: physical drying (evaporation of solvents) and oxidative curing (absorption of oxygen).

- **Physical drying**
  The following data related to a wet film thickness of approx. 50 µm (equivalent to a dry film thickness of approx. 25-30 µm, or of 20-25 µm for adjustment **/23**, respectively) serves as a guideline.

	At room temperature (approx. +23 °C [73.4 °F])	In hot air units with exhaust air
Drying (dust-dry)	approx. 50 min approx. 35 min for adjustment **/23**	—
Drying (tack-free) acc. to DIN EN 60464 (IEC 60464)	approx. 90 min	approx. 20 min

- **Oxidative curing**
  Owing to the absorption of necessary oxygen, oxidative curing takes longer at room temperature; however, it can be accelerated by applying heat, e.g. 6 h at 80 °C [176 °F].

Standard 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 12 months

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

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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