

Via filler PP 2794 TG170

The via filler **PP 2794 TG170** permits a blister-free planar filling/plugging of vias and a subsequent application of smooth insulation layers in HDI/SBU technology (high density interconnect/sequential build up).

- Solvent-free 1-pack system
- application by means of screen and stencil printing or vacuum plugging
- also available in cartridges
- 6 months shelf life at 5-10 °C [41-50 °F]
- high glass transition temperature, low coefficients of thermal expansion
- pluggable diameters of approx. 0.1 to 2 mm, very much depending on the “aspect ratio“ of the vias to be plugged
- corresponds to the best flame class V-0 according to UL 94
- excellent metallisability
- very low volume shrinkage, no “dish down“
- no cracking or delamination of the metallised layer applied
- good adhesion
- good grindability

Characteristics

Colour/ appearance	Solids content	Viscosity* at 20 °C [68 °F], DIN EN ISO 3219	Density 20 °C [68 °F], DIN EN ISO 2811-1
white	100 %	approx. 65000 mPas	approx. 1.7 g/cm ³

* measured with Haake RS 600, C 20/1°, D = 50 s⁻¹,
viscosity measuring unit supplied by Thermo Fisher Scientific, www.thermofisher.com

Index TG170: TG = 170 °C

Physical and mechanical properties

Property	Test method	Result
Glass transition temperature Tg	TMA	≈ 171 °C [339,8 °F]
Coefficient of thermal expansion CTE	TMA	≈ 18 ppm/°C < Tg ≈ 58 ppm/°C > Tg
Adhesion	IPC-SM-840E, 3.5.2.1	passed
Pencil hardness	IPC-SM-840E, 3.5.1 acc. to Wolff-Wilborn	≈ 9 H ≈ 9 H
Solvent resistance	IPC-SM-840E, 3.6.1.1	passed
Resistance to acids	10% H ₂ SO ₄ 20 °C [68 °F], 1 h	passed
Resistance to lyes	10% NaOH, 20 °C, [68 °F], 1 h	passed
Solder bath resistance	IPC-SM-840E, item 3.7.2 IPC-TM-650, 2.6.8	passed: 20 s at 265 °C [509 °F] passed: 10 s at 288 °C [550.4 °F]
Simulated lead-free reflow soldering I	IPC-SM-840E, 3.7.3.1	passed: 5 x 10 s at 260 °C [500 °F]

Electrical properties

Property	Test method	Result
Comparative Tracking Index (CTI, Tracking resistance)	DIN EN IEC 60 112, on FR 4 base material with CTI 600	≈ CTI 600

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.

TI

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

TI

[Technical information TI 15/13](#) "Precognizing in the pcb fabrication process"

The via filler **PP 2794 TG170** can be applied by means of screen and stencil printing or vacuum plugging.

The processing parameters specified are given for orientation purposes and, depending on the layout of the printed circuit board and the "aspect ratio" of the plated-through holes to be filled, must be optimised and adjusted to prevailing production conditions. The via filler **PP 2794 TG170** must be processed in the condition supplied.

- Ensure that the surface to be coated is clean, dry and grease-/oxide-free and that copper surfaces preferably have an average surface roughness of 2 µm.
- Store cartridges in an upright position. Prior to use, slightly depress plunger to expel potential air pocket at top. This will avoid the inclusion of extraneous air in the plugging process.

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.

Auxiliary products recommended

- [ELPESPEC® screen opener HP 5200](#)
highly active spray for dissolving dried screen printing inks from the screen; silicone- and grease-free, thus no surface defect/dewettings or smearing effects to be expected
- [ELPESPEC® anti-static spray HP 5500](#)
prevents and eliminates electrostatic discharge occurring during screen printing; silicone- and grease-free
- [ELPESPEC® cleaning agent R 5899](#)
for screen washing equipment, simply and safely to handle, no labelling in accordance with the German dangerous goods regulations required, extremely high flash point (> 100 °C [> 212 °F]), low vapour pressure < 0.1 hPa at 20 °C [68 °F], thus not affected by the EU-VOC regulation 1999/13/CE
- [ELPESPEC® cleaning agent R 5821](#)
for the cleaning of equipment and work tools, high flash point (+32 °C [89.6 °F])
- [ELPESPEC® cleaning agent R 5817](#)
for the manual cleaning of screens and tools

Screen and stencil printing

Screen printing parameters recommended

Screen fabric	Steel fabric: - 224/100 - 245/65 - 265/50
Screen printing stencil	free spaces in the screen fabric > hole diameter (0.3 – 0.5 mm larger depending on print format size) A high stencil build-up is not necessary as the ink should only be printed into the vias. As a rule, it is sufficient to close the screen mesh with a thin coat of emulsion or a thin capillary film.
Printing underlay	Base material of approx. 3 mm thickness that has been drilled with the same drill program but where the diameters of the holes are five times the size of the actual vias (the printing underlay enables the filling of the holes since there is no resistance caused by air pockets under the holes). An undergrid would also be acceptable provided it does not permit the printing substrate to spring.
Snap-off	Low
Flooding	Rubber squeegee 75 Shore A push stroke 70°
Printing	Rubber squeegee 75 Shore A, squeegee profile 30–45°, printing angle 90° As high a squeegee pressure as possible (4 bar) and as low a printing speed as possible

Vacuum plugging processes

The following parameters are meant for orientation purposes and may vary considerably.

Possible Parameters

Vacuum	10–15 mbar
Print speed	2–8 mm/s
Paste pressure	0.5–1.5 bar
Head pressure	3–5 bar

Drying/curing

→ Cure the via filler **PP 2794 TG170** for approx. **60 min at 150 °C [302 °F]***

* Object holding time: The time is measured from the point where the panels reach the curing temperature.

Owing to the high thermal absorption of thick printed circuit boards the curing time may be longer.

As a general rule, longer curing times and higher temperatures up to 180 °C [356 °F] do not provoke any negative effect in respect of the via filler's functionality.

→ Store the pcbs vertically for curing to avoid dipping of the via filler into the holes.

Grinding

After curing, any remaining material is removed from the pcb by means of ceramic rollers or similar devices. Then the metallisation can be effected by means of the common methods practised in pcb production.

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 containers at least 6 months

Store cartridges in upright position.



Storage conditions: +5 °C to + 10 °C [+41 °F to + 50 °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.

ATTENTION! For new products, according to preliminary technical reports, adequate practical results are not always available which would permit a comprehensive assessment of such a product. It is therefore imperative to exercise particular care in the testing of such products with regard to the application intended!

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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