

- safe closing of via holes
- solvent-free
- no drying in the screen
- 100% solids content means practically no volume shrinkage
- joint curing with solder resists possible

This technical report is valid for the following adjustments:

- **SD 2361**, green
- **SD 2361 T**, green, thixotropic
- **SD 2361 PBF-T**, Probimer colour, thixotropic

Indices: **SD = Screen printing**
T = Thixotropic
PBF = Probimer colour

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Please read this technical report and the material safety data sheet according to EEC 91/155 carefully before using the product.

1. General information

The via hole fillers of the series **SD 2361** are 1-pack screen printing inks which are applied by screen printing in printed circuit board manufacturing to plug via holes.

2. Application

In printed circuit board manufacturing it is often necessary to close via holes with ink in order to:

- avoid solder seeping through to the component side,
- avoid flux residues settling in the holes and forming critical microclimates in the holes and/or under components,
- ensure the sealing for vacuum adaption during the incircuit-test.

Due to the 100% solids content there is practically no volume shrinkage during curing so that the wet film thickness virtually corresponds to the dry film thickness. Therefore, the via hole fillers of the series **SD 2361** should be preferred compared to 2-pack solder resists, because due to their solvent content the 2-pack solder resists may show a certain volume shrinkage when drying, and holes could remain open.

Furthermore, when using 2-pack solder resists for the filling of via holes, there is always the latent danger of occluding solvents which can lead to explosive evaporations during the later soldering process.

Thus the great advantage of the via hole fillers of the series **SD 2361** can be seen in a considerable improvement of the processing safety.

3. Special notes

The thixotropic adjustments of the via hole fillers of the series **SD 2361** (see coverage) are particularly suitable for larger holes (approx. 0.5 – 0.8 mm).

For the generation of extra-smooth, metallizable hole plugs, e. g. for SBU technology, plugging pastes are available which are applied by screen printing (**PP 2795-SD**)* or roller coating (**PP 2795**)*. It concerns a solvent-free 1-pack system, which is distinguished by a bubble-free processing, good adhesion, grindability and metallization.

* Special technical reports for these products are available upon request. In our report manual these technical data sheets are filed under group 2.

4. Safety recommendations

→ Please read our material safety data sheet according to EWG 91/155 where you will find detailed specifications of safety precautions, environmental protection, waste disposal, storage, handling, exhaust air regulations as well as other characteristics.

→ When using chemicals, the common precautions should be carefully noted.

5. Characteristics

	SD 2361	SD 2361 T	SD 2361 PBF-T
Colour, appearance	green	green	green (Probimer colour)
Solid contents	100 %	100 %	100 %
Viscosity* at 20 °C [mPas] EN ISO 3219/ISO 3219	26 000 ± 8 000	37 000 ± 10 000	37 000 ± 10 000
Density at 20 °C [g/cm ³] DIN 53 217, part 2	1.14 ± 0.05	1.14 ± 0.05	1.14 ± 0.05

* measured with Haake RS 100, C 20/1°, D = 50 s⁻¹,
viscosity measuring unit supplied by: Haake Mess-Technik GmbH + Co
Dieselstraße 4, 76227 Karlsruhe, Germany
Telephone +49 7 21 40 94 - 0
Telefax +49 7 21 40 94 - 360

6. Properties

The via hole fillers of the series **SD 2361** are distinguished by the following properties:

6.1 General properties

- Solvent-free, i. e. wet film thickness corresponds largely to dry film thickness, practically no odour nuisance,
- No drying in the screen,
- Safe closing of holes,
- Compared to via hole filling with 2-pack solder resists lower manufacturing expenditure and higher processing safety,
- Joint curing with solder resists possible, thus process acceleration and low thermal stress,
- Excellent E-corrosion resistance.

6.2 Physical and mechanical properties

Property	Test method	Result
Adhesion	IPC-SM-840 C, item 3.5.2.1	class H and T
Solvent resistance	30 min in dichloromethane at room temperature	passed (> 120 min)
Solder bath resistance	IPC-SM-840 C, item 3.7.2 MIL - P 55 110 C	passed: 20 s at 265 °C passed: 10 s at 288 °C

6.3 Electrical properties

Properties	Test method	Result
Dielectric breakdown	VDE 0303, part 2	70 kV/mm
Surface resistance	VDE 0303, part 3	2×10^{14} Ohm
Volume resistivity	VDE 0303, part 3	5×10^{15} Ohm x cm

7. Processing

7.1 Adjustment of viscosity

The via hole fillers of the series **SD 2361** are supplied in printing viscosity and **must not** be diluted in order to maintain the 100% solids content, which ensures safe closing of via holes.

7.2 Auxiliary products

We recommend the following auxiliary products for screen-printing:

- **Screen opener HP 5200**

The screen opener **HP 5200** is a highly active spray for dissolving dried screen-printing inks immediately and safely from clogged screens. **HP 5200** is silicone-free and does not contain oils or oily substances, so that no smearing occurs.

- **Anti-Static-Spray HP 5500**

The anti-static spray **HP 5500** prevents and eliminates any static charge that occurs during screen printing. **HP 5500** is silicone- and grease-free.

- **Cleaning agents R 5899 and R 5817**

The cleaning agent **R 5899** does not have to be marked according to dangerous goods regulations, nor does it fall under the German regulations for flammable liquids and thus can be handled simply and safely. Owing to its high flash point (> 100 °C) it is especially suitable for use in screen washing equipment. The cleaning agent **R 5899** is particularly distinguished by a low vapour pressure (< 0.1 hPa at 20 °C) and thus is not affected by the EU-VOC regulation 1999/13/EG which judges solvents by their percentage of volatile organic compounds (VOC = volatile organic compounds) and has to be implemented under national law by April 2001.

For the manual cleaning of screens and tools we recommend our cleaning agent **R 5817** with its fast and thorough cleaning properties.

Special technical reports for these products are available upon request. Further information regarding the content and consequences of the EU-VOC regulation 1999/13/EG can be found in our technical information sheet TI 15/110 E “EU-VOC regulations – Content and consequences for the PCB industry”. In our report manual technical publications are filed under group 5 and 15.

7.3 Screen printing

- Ensure that the via hole fillers of the series **SD 2361** are printed in dust-, grease- and oxide-free via-holes.
- Use 35 - 43 T polyester fabric or corresponding steel mesh.
- When making the screen stencil, ensure voids in screen mesh are slightly larger than the drill hole diameter (take into consideration when using drill hole program).

A high stencil build-up is not necessary, since the ink must only be printed into the holes. Generally, it is sufficient to fill the screen mesh, through which costs for screen manufacture can be reduced.

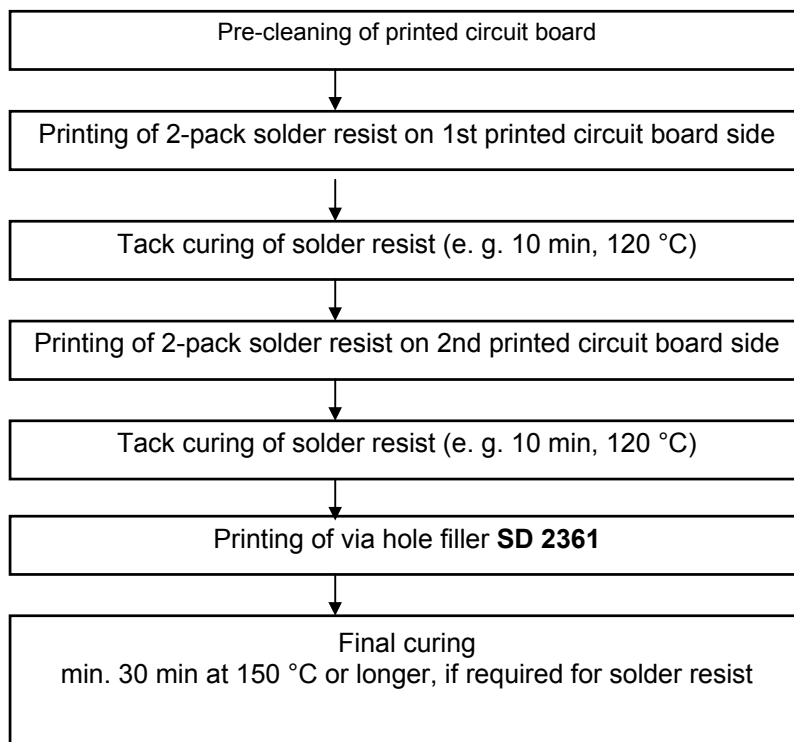
- Use a rubber squeegee with a shore-A hardness of 65.
- Perform preliminary tests in order to determine the optimal adjustments for off-contact, squeegee profile and squeegee angle.
- If necessary, round edges of squeegee in order to insert a larger quantity of via hole filler into the hole.

In case holes are not closed completely:

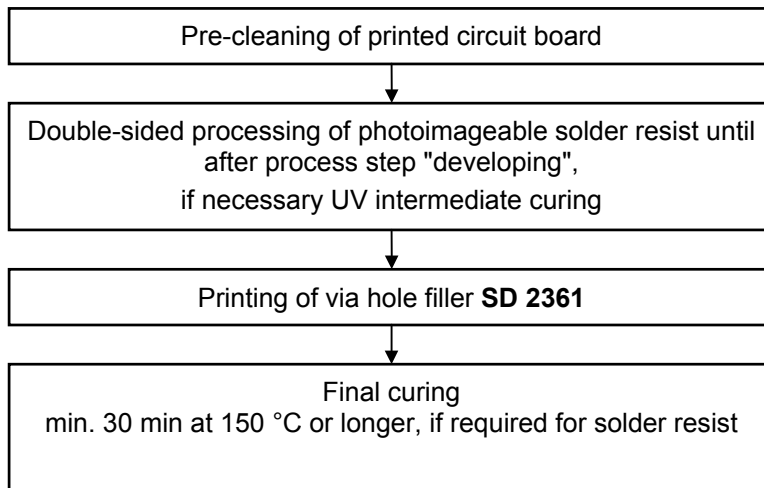
- Use a rubber pre-squeegee in order to enable better flooding of the mesh.
- If necessary, print twice or multiple times “wet in wet” in order to enable better filling of holes.

7.4 Process steps

- When using a conventional 2-pack solder resist, e. g. of the series **SD 2462 NB** or **SD 2468 NB**, in combination with via hole filler **SD 2361**:



- When using photoimageable 2-pack solder resists, i. e. of the series **ELPEMER 2467** or **2469 SM** in combination with via hole filler **SD 2361**:

**ATTENTION:**

These process steps are non-binding recommendations. Perform pre-trials to adapt the process to individual production conditions.

8. Drying/Curing

The via hole fillers of the series **SD 2361** are cured under the following conditions:

30 - 45 min* at 150 °C.

* Object holding time: Curing time is calculated from the point when the printed circuit boards reach the curing temperature.

Curing can be also carried out in an IR conveyerised dryer.

→ Pre-trials are recommended to ascertain the optimum temperature profile for curing the via hole filler.

9. Standard packaging

The via hole fillers of the series **SD 2361** are packed for delivery as follows:

10 tins of 0.5 kg = 5 kg = 1 selling unit.

Partial lots of the selling unit are possible, but will entail surcharges to cover repackaging costs.

10. Storage

In a cool, dry place, sealed original containers can be stored for at least 4 months.

Storage at 8 °C (refrigerator) prolongs durability of product. When exceeding the specified expiry date, we recommend to carry out pre-trials for reasons of quality assurance.

In accordance with EN ISO 9001, labels on containers show expiry dates.

**ATTENTION:**

Temperatures below +5 °C destroy the via hole fillers of the series SD 2361. Moisture and temperatures in excess of +25 °C reduce durability.

11. Further literature/Technical publications

In addition to the recommendations given in this technical report, we can provide technical papers and information sheets written and compiled by members of our staff which give highly detailed information on the application and processing of our products. A list of the technical publications available can be found in **TI 15/101 E** (technical papers) and **TI 15/100 E** (technical information sheets).

In our report manual all technical information sheets (TI's) are filed under group 15. Or visit our website at <http://www.peters.de>.

12. Further products for the production of pcbs

We offer a wide range of **etch resists (photoimageable, UV curing, conventional curing), plating resists, solder resists (photoimageable, UV curing, conventional curing) as well as peelable solder resists, marking inks (photoimageable, UV curing, conventional curing), carbon-conductive inks, via hole fillers (solely thermally curing), plugging pastes, heatsink pastes and further auxiliary products for screen printing (e. g. cleaning agents, thinners).**

Special technical reports on these products are available on request.

13. Further products for electronics/ electrical engineering industries

We boast a wide range of **conformal/permanent coatings, casting compounds, casting resins, electro pastes, insulating lacquers, impregnating varnishes, adhesive lacquers, chip adhesives and auxiliary products for electronics.**

Special technical reports are also available for these products and can be provided on request.

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.

The above information as well as advice given by our Application Technology Department whether in verbal or written form or during product evaluations is provided to the best of our knowledge, but must be regarded as non-binding recommendations, also with respect to possible third-party proprietary rights.

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 of our material safety data sheets and technical information sheets, and of our products 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.

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Supplement to technical report Via hole fillers of the series

SD 2361

Edition LP 001110 E-1

3. Special notes

The via hole filler **SD 2361** has been certified for aerospace applications. It has passed the **Outgassing test** acc. to ASTM E595.

The **NASA** (**N**ational **A**eronautics and **S**pace **A**dmistration)-approved test method demands the measurement of two parameters:

- Total mass loss (% TML)
- Collected volatile condensable material (% CVCM).

These two measurements are decisive for the use of products in a vacuum. Outgassing materials may condensate at the sensitive components and thus lead to problems/defects.

The test report on hand confirms fulfilment of the relevant test criteria: The determined values are far below the values of 1.00% for TML and 0.10 % for CVCM that are stipulated for most application purposes.

Thus the via hole filler **SD 2361** is the ideal product for use in aerospace electronics. It belongs to the approved via hole fillers of the NASA Jet Propulsion Laboratory.