Lackwerke Peters GmbH + Co KG
Hooghe Weg 13, D-47906 Kempen
Internet: www.peters.de
E-Mail: peters@peters.de
Telefon (0 21 52) 20 09-0
Telefax (0 21 52) 20 09-70
Ein Unternehmen der PETERS-Gruppe

PETERS
Speziallacke für die Elektronik

PTR PRELIMINARY TECHNICAL REPORT

Peelable solder mask

SD 2955

- **blue-green**
- peelable solder resist
- for lead-free soldering processes
- very high elasticity
- highly thixotropic
- especially suited for use in reflow soldering (SMD technology)
- does not contain substances specified in the RoHS regulation 2002/95/EC and WEEE regulation

Index: **SD = screen printing**

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Contents

Please read this preliminary technical report, the material safety data sheet according to EEC 91/155 and Technical Information Sheet TI 15/7 "Selection criteria and processing advice for our peelable solder resists (solder masks) of the series SD 2950" (see Item 7) carefully before using the product.

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1. General information

The peelable solder mask **SD 2955** is a particularly heat resistant 1-pack screen-printable ink that can be easily peeled off like a film before or after soldering leaving no residues.

2. Application

The peelable solder mask **SD 2955** is used to cover areas of printed circuit boards that must not be tinned during different types of soldering processes, e. g.

- Gold contacts
  SD 2955 provides a reliable cover for all gold contacts on the board. Even gold-plated rotary contacts, which can only be masked with great difficulty, if at all, when using tapes are covered without leaving any traces of glue behind - A prerequisite for the use of automatic soldering units for certain types of assemblies. Unlike with tapes, no complicated removal of residues of glue is necessary.
- Multipoint connectors
  Compared with the use of masking tapes, **SD 2955** enables a significantly more efficient and reliable fabrication process.
- Plated-through holes
  For selective or multiple soldering (e.g. SMD mixed assemblies, manual and automatic soldering, etc.), large areas of the board can be covered, whereby the ink can be printed into plated-through holes from where it can subsequently be removed without leaving any residues.

To ensure optimum peeling, the peelable solder mask must be printed at a thickness of at least 300 µm to guarantee the necessary tear and reflow resistance. In this respect, particular attention should be paid to Items 7 and 8 of this report "Processing" and "Drying/curing" respectively.

3. Special notes

The use of peelable solder masks in lead-free soldering processes, especially in SMD technology is particularly problematical because with this type of application the ink layers are subjected to multiple, partly very high temperature stresses. In order to ensure sufficient wetting by the solder, besides high lamp temperatures also longer processing times are necessary during lead-free reflow soldering. However, owing to its enormous temperature stability as well as its high elasticity **SD 2955** is ideally suited even for these critical processes.

As peelable solder masks generally are not fit for hot-air levelling, trials must be conducted to check their suitability prior to their use in this type of process. In most cases, we recommend our peelable solder masks SD 2950 and SD 2950 T for hot-air levelling applications (multipoint connectors, carbon-conductive ink surfaces).

Furthermore, the peelable solder mask SD 2954, blue transparent and the peelable solder mask SD 2990 T, white are ideally suited for printing over carbon-conductive inks.

A special technical report on these products is available upon request. In our report manual this data sheet is filed under group 2. On our report manual CD you will find Technical Reports in the “Products” section.

NOTE:
Our **Technical Information Sheet TI 15/7**: "Selection criteria and processing advice for our peelable solder resists (solder masks) of the series SD 2950" gives further detailed advice on processing, application and characteristics. We would gladly send you TI 15/7 upon request. In our report manual, this technical information sheet is filed under group 15. On our report manual CD as well as at the website you will find Technical Information sheets in the “Service” section.

4. Safety recommendations

➔ Please read our material safety data sheet according to EEC 91/155 where you will find detailed specifications of safety precautions, environmental protection, waste disposal, storage, handling, transport as well as other characteristics.
➔ When using chemicals, the common precautions should be carefully noted.

5. Characteristics

Colour/appearance	blue-green
Solids content ISO 3251, 1 h, 125 °C [257 °F], 1 g	98 ± 1 % by weight
Viscosity* at 20 °C [68 °F] ISO 3219	55,000 ± 15,000 mPas
Density at 20 °C [68 °F] ISO 2811-1	1.12 ± 0.05 g/cm³

* measured with Haake RS 600, C 20/1°, D = 50 s^{-1}; viscosity measuring unit supplied by:
Thermo Electron (Karlsruhe) GmbH (formerly Haake Mess-Technik GmbH + Co)
Dieselstraße 4, 76227 Karlsruhe, Germany
Phone +49 - (0) 7 21 - 40 94 – 0, Fax +49 - (0) 7 21 - 40 94 - 300
www.thermo.com

6. Properties

The peelable solder mask **SD 2955** is distinguished by the following properties:

- solvent-free; thus no environmental pollution caused by solvents
- solids content is approx. 100 %, i. e. the achieved dry film thickness virtually matches the wet film thickness
- unlimited pot life
- does not contain substances specified in the RoHS regulation 2002/95/EC and WEEE regulation 2002/96/EC
- highly thixotropic adjustment guarantees sharp definition of outlines and good tenting even of larger via holes up to 3 mm
- high elasticity even after multiple and extended temperature stress, therefore especially suited for use in lead-free soldering processes
- also proven in conventional soldering processes, particularly on critical substrates (e. g. electroless Ni/Au) where it is vital that as few residues as possible remain after the peelable solder mask has been removed
- during reflow soldering where, in particular, high lamp temperatures combined with long processing times prevail, a maximum temperature resistance of 260 °C [500 °F] can be achieved
- high tear resistance, even after multiple soldering processes
- practically no risk of staining of base material
- excellent solder bath resistance even with long soldering times
- residue-free removal, even from plated-through holes, simply by peeling off
- peelable before or after soldering.

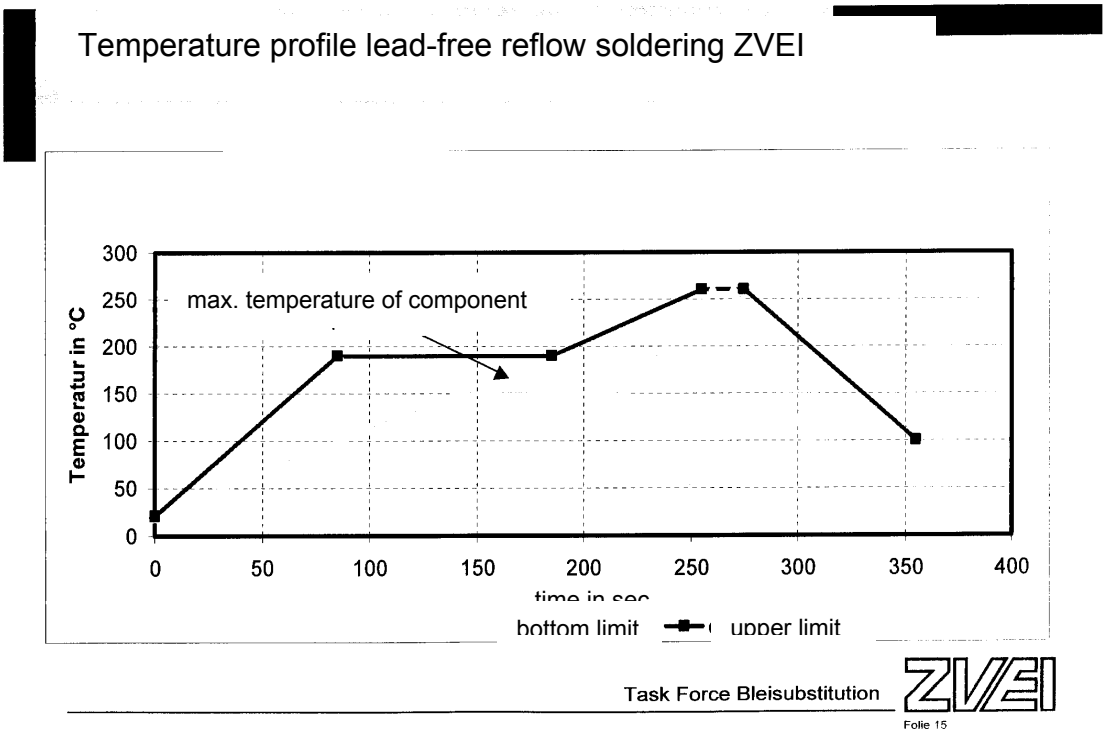

Diagram 1: Model temperature profile for lead-free reflow soldering (layer thickness 400 µm, curing time 10 min 130 °C [266 °F])

7. Processing

➔ Please read our **Technical Information sheet TI 15/7 "Selection criteria and processing advice for our peelable solder resists (solder masks) of the series SD 2950**" where you will find detailed information on processing. In our report manual this Technical Information sheet is filed under group 15. On our report manual CD and on our website you will find Technical Information sheets in the "Service" section.

7.1 Adjustment of viscosity

The peelable solder mask **SD 2955** is adjusted in such a manner that it normally can be processed in the condition supplied. A process relevant reduction in viscosity is only possible with reactive thinner **VR 2950**. The quantity to be added must not exceed 2%.

As the reactive thinner VR 2950 participates in the curing process it is impossible to use any other thinners or solvents.
Please consider that when a thinned peelable solder mask is printed thinner layers will be achieved and the solder resistance and/or peelability may be impaired. Perform pre-trials to ensure that the thinned peelable solder mask can be peeled-off perfectly and without any residues.

7.2 Auxiliary products

- **Cleaning agents R 5899, R 5821 and R 5817**
  The cleaning agent **R 5899** does not have to be marked according to German dangerous goods regulations and can be handled simply and safely. Owing to its high flash point (> 100 °C [> 212 °F]) 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 [68 °F]) 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).

Furthermore, the cleaning agent **R 5821** is available which, owing to its high flash point of +32 °C [89.6 °F], is also suitable for use in screen washing equipment as well as for cleaning work tools. For the manual cleaning of screens and tools we recommend our cleaning agent **R 5817** with its fast and thorough cleaning properties.

Do not use cleaning agent as a thinner or for washing hands since solvents remove the natural grease from skin.

Special technical reports for these products are available upon request. Further information regarding the content and consequences of the EU-VOC regulation can be found in our **t**echnical **i**nformation **sheet TI 15/110 E "EU-VOC regulations – Content and consequences for the PCB industry"**. In our report manual these technical publications are filed under group 5 and 15. On our report manual CD you will find technical reports in the "Products" section and technical information sheets in the "Service" section.

7.3 Screen printing

SD 2955 is applied by screen printing. To ensure optimum peeling, the printed coating must be bubble-free and at least 300 µm thick. This can be achieved in one print by using extremely coarse screen fabrics combined with a very high stencil build-up.

Recommended screen printing parameters

Screen fabric	Polyester 12 - 18 T (lines/cm) or S (30 mesh) (in accordance with new nomenclature polyester 12-140 up to 18-250)
Screen tension	18 N/cm
Snap-off	as low as possible
Screen coating/ stencil build-up	Particularly suitable stencil materials are presensitised, direct/indirect photopolymer films for making thick-film stencils that are available in thicknesses of approx. 200 µm and more. We would be glad to name manufacturers of screen printing stencils upon request.
Squeegee	60 - 65 Shore A, if necessary with rounded blade
Squeegee angle	approx. 75°
Squeegee pressure	as low as possible
Squeegee speed	as low as possible

To achieve a satisfactory coating thickness in one print as far as possible, the screen fabric must be very well filled before commencing printing. If this is not achievable with standard metal pre-squeegees, the use of an elastomeric squeegee is recommended.

NOTE:
To make it easier to subsequently peel off the solder mask, we recommend also printing a pull tab. Where possible, neighbouring masked areas should be linked by strips of peelable.

8. Drying/curing

Depending on the type of application and the required properties, suitable drying conditions for the peelable solder mask **SD 2955** must be determined and utilised:

Required properties / Drying conditions	• Peelable before and after soldering • Resistant to wave soldering • Resistant to reflow soldering	• Peelable after soldering only • Resistant to wave soldering after reflow soldering • Resistant to reflow soldering	• Resistant to vertical hot-air levelling (pretrials)
Ink drying oven/ convection oven: Temperature: Time:	150 °C [302 °F] 30 min*1	130 °C [266 °F] 10 min*1	130 °C/150 °C [266 °F/302 °F] 60 min*1/30 min*1
Infra-red conveyorised dryer: * 2 Temperature: Time:	160 °C - 180 °C [320 °F – 356 °F] 3 - 5 min	160 °C - 180 °C [320 °F – 356 °F] 2 - 3 min	160 °C - 180 °C [320 °F – 356 °F] 5 - 8 min

*[1] Object holding time: The drying time is measured from the point when the panels reach the curing temperature.

*[2] Pretrials to ascertain the optimum adjustment of the IR dryer are recommended.

9. Standard packaging

The peelable solder mask **SD 2955** is packed for delivery as follows:

1 bucket of 6 kg = 1 selling unit

Partial lots of the selling unit may be ordered but will entail surcharges to cover repackaging costs.

10. Storage

In a cool dry, place, sealed original containers can be stored for at least 6 months. 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.

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

Storage temperatures in excess of +25 °C [77 °F] affect the storage stability.

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. 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 **t**echnical **i**nformation sheets **(TI's)** are filed under group 15. Alternatively, visit our website at **http://www.peters.de** or click on the "Service" section on our report manual CD.

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 masks, marking inks (photoimageable, UV curing, conventional curing), carbon-conductive inks, via hole fillers (purely thermal curing), thick film fillers, plugging pastes, heatsink pastes, special strippers for solder resists and further auxiliary products for screen printing (e. g. cleaning agents, thinners).**

Special technical reports are also available for these products and can be provided on request. On our report manual CD you will find technical reports in the "Products" section.

13. Further products for the electronics/electrical engineering industries

For the production and processing of assembled printed circuit boards and for electrical engineering we recommend the following products:

- **ELPEGUARD conformal/permanent coatings**
  Protective lacquers for assembled PCBs on the basis of polyurethane, polyacrylic, epoxy and silicone resins, water-thinnable, fluorescent and lead-free adjustments available, selected products UL-approved as conformal or permanent coatings.
- **ELPEGUARD TWIN-CURE® thick film lacquers**
  Solvent-free 1-pack systems with the resistance of 2-pack systems for thick film applications, short processing times on account of ideally synchronised curing processes: fast UV curing and progressive cross-linking in shaded areas by reaction with atmospheric humidity, can be handled directly after UV cure, excellent edge coverage.
- **ELPEGUARD silicone thick film lacquers**
  Solvent-free 1-pack systems with a high chemical and thermal resistance, cold and/or thermo curing, on account of their high elasticity particularly suitable to cover delicate components and components that are sensitive to mechanical stress.
- **Silicone gels**
  Addition cross-linking, thermo curing 1-pack system, extremely flexible, consequently only low thermo-mechanical tensions and thus recommendable for the permanent sealing and embedding of very delicate, sensitive electronics and hybrids.
- **Casting compounds**
  Cold and thermo curing casting compounds for potting assembled PCBs, print and mini transformers, transformers and solenoids on the basis of epoxy, polyurethane and silicone-rubber, selected products with UL approval.
- **Casting resins**
  For impregnating and insulating all kinds of coil shells, particularly for high-revolution mini rotors.
- **Electro pastes**
  Cementing compounds for coil shells and solenoids, also anchor and electro adhesives for the mechanical engineering industry.
- **Insulating varnishes**
  For use in the electrical engineering industry to insulate impregnated coils and windings.
- **Impregnating varnishes**
  Impregnating varnishes for all kinds of coil shells, particularly for transformer coils.
- **Adhesives and adhesive lacquers**
  For numerous adhesion techniques in the electronics and electrical engineering industries.
- **Auxiliary products for electronics**
  Chipping lacquers, sealing agents, mould-release agents, cleaning agents, etc.

Special technical reports are also available for these products and can be provided on request. On our report manual CD you will find technical reports in the "Products" section.

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 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.

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!

Lackwerke Peters GmbH + Co KG
Hooghe Weg 13, 47906 Kempen

Internet: www.peters.de
E-Mail: peters@peters.de

Phone: 0049-21 52-20 09-0
Fax: 0049-21 52-20 09-70