

ProConduct

Process description

Publisher LPKF Laser & Electronics SE
Osteriede 7
30827 Garbsen
Germany

Phone: +49 5131-7095-0

Fax: +49 5131-7095-90

Email: info@lpkf.com

Date of issue 25.06.2025

Copyright © 2025 LPKF Laser & Electronics SE

This document and its contents in whole and in parts are subject to copyright. The reproduction, translation or duplication of the contents as photocopy or any digital form requires written permission of LPKF Laser & Electronics SE.

Translation of the German original document

General information

This document contains all information for the intended use of the system/product delivered. This document is intended for persons with basic knowledge of installation and operation of software-controlled systems. General knowledge of operational safety as well as basic knowledge of using PCs running Microsoft Windows® are required.

- ▶ Read this document and possibly associated safety data sheets carefully before first start-up and usage of the components.
- ▶ Observe the safety regulations as well as the regulations on operational health and safety and protection of the environment.
- ▶ Use the system/product only in a technically perfect condition.
- ▶ Observe all labels and safety signs on the system/product.
- ▶ Never remove the safety signs and replace or clean them if not readable anymore.
- ▶ Persons who install, operate, uninstall, or maintain our systems/products must not be under the influence of alcohol, other drugs, or medication that impairs the ability to react.
- ▶ Use only approved spare parts and accessories in order to prevent injuries due to unsuitable spare parts and accessories.
- ▶ Observe the technical data and ambient conditions specified in this document.

Validity

This document is part of the system/product and corresponds to the technical state at the time of publication. This document has always to be present at the system/product and has to be available to the operating personnel without restrictions, in a complete and legible form and at all times. If the operator changes, this document has to be handed over together with the system/product. The operator has to ensure that all safety measures specified in this document are observed.

The operating personnel must have read and understood this document before performing any task. A basic requirement for safe work is observance of all safety notes and steps. This document contains important information about the system/product that has to be observed when installing, first starting up, or maintaining the system/product. Its structure allows trained personnel to perform all tasks.

LPKF Laser & Electronics SE (abbreviated to **LPKF** in the following) reserves the right to make changes in respect to the content of this document. The figures in this document serve as basic understanding and can differ from the actual state of the system.

Structure of warning messages and safety notes

The safety notes and warning messages in this document identify hazards and risks and they are created in accordance with ANSI Z535.6-2011 and the standards series ISO 3864.

The warning messages are structured as follows:

- Warning sign (only for injuries)
- Signal word indicating the hazard class
- Type and source of the hazard
- Consequences of non-observance
- Measures to avoid the hazard

 + SIGNAL WORD
Type and source of the hazard! Consequences of non-observance. ► Measures to avoid the hazard. ► Further measure(s) to avoid the hazard.

Warning messages can also be embedded in the format of the surrounding text in order to avoid a *visual disruption* in a sequence. In this case, they are distinguished as follows:

Type and source of the hazard!

Consequences of non-observance.

- Measure(s) to avoid the hazard.

Warning messages are classified in hazard classes represented by the signal word. In the following, the warning messages are described in accordance to their hazard classes:

 DANGER
Type and source of the hazard! This warning message indicates a hazard of high risk that causes death or serious injury if not avoided. ► Measures to avoid the hazard.

 WARNING
Type and source of the hazard! This warning message indicates a hazard of medium risk that can cause death or serious injury if not avoided. ► Measures to avoid the hazard.

 CAUTION
Type and source of the hazard! This warning message indicates a hazard of low risk that can cause minor or moderate injury if not avoided. ► Measures to avoid the hazard.

NOTICE

Type and source of the hazard!

This warning message indicates a hazard that can lead to possible property damage.

► Measures to avoid the hazard.

Text styles

Various text attributes, notations, and text structures facilitate reading the document. The text attributes (highlightings) inside this document are defined as follows:

Attribute	Function
<i>italic</i>	highlights elements of the user interface and of control elements of the system
bold	highlights important information and keyboard input
Courier New	highlights file paths
[]	highlights elements of buttons on software user interfaces
key	highlights keys of the keyboard

Tasks or procedures that are described in steps are compiled to sequences in this document. A sequence consists of at least three components: objective, step, and result.

Component	Description
■	Indication of an objective. The sequence starts here.
1. 2. 3.	Indication of a sorted list of steps. The specified order must be observed.
□	Indication of an intermediate result that is followed by further steps or the result.
☑	Indication of the result. The sequence is finished.
►	Indication of a single step.

Additional information

The following symbols are used to indicate additional information:



This note indicates especially useful information.

**Advanced information**

This advanced information indicates special knowledge.

Registered Trademarks

Product and brand names are trademarks of LPKF Laser & Electronics SE, registered among others at the US Patent and Trademark Office: LPKF®, and the company logo, # 2,385,062 and # 2,374,780; SolarQuipment®, # 3,494,986; ProConduct®, # 3,219,251; Allegro®, # 3,514,950.

Microsoft® and Windows® are brand names or registered trademarks of Microsoft Corporation in the USA and/or other countries. All other trademarks belong to the respective owner.

Issued patents, if applicable, are listed in the appendix.

Limited liability

All data, notes and instructions in this document have been prepared with consideration to the statutory standards and regulations, the present state of technology, as well as our many years of knowledge and experience.

LPKF accepts no liability for damage due to:

- non-observance of this document
- improper use of the system/product
- employment of personnel that is not sufficiently qualified
- unauthorized modification
- technical changes
- unauthorized manipulation of the safety devices
- use of spare parts that are not approved by LPKF

The actual scope of delivery can deviate from the explanations and presentations given here, due to custom designs, the utilization of additional order options, or due to the most recent technical changes.

We reserve the right for technical modifications of the product for reasons of improved usability and future development.

The responsibilities agreed in the delivery contract, the General Terms and Conditions as well as the delivery conditions of the manufacturer and the statutory regulations valid at the time of the conclusion of the contract are effective.

Warranty

Please note that the warranty is subject to the current regulations in combination with the current General Terms and Conditions.

All information and instructions in this document have been compiled in observance of current regulations and the current state of the art. Before working with the system/product, this document has to be read carefully. The manufacturer assumes no liability for damage and faults due to non-observance of this document.

LPKF Laser & Electronics SE provides a 12-months warranty if the following conditions are met:

- The warranty starts on delivery.
- The warranty covers defects in material or manufacture. During the warranty period, such defects are remedied without cost by replacement or rework of the defective parts. This service is provided by the LPKF Service.
- The operating conditions described in this document have been complied with.
- The maintenance work described in this document has been executed and documented at the specified maintenance intervals.

For further information on wear parts refer to the chapter scope of delivery.

Customer service

For technical information contact our LPKF Service:

Address	LPKF Laser & Electronics SE Service & Support Rapid Prototyping Osteriede 7 30827 Garbsen Germany
Phone	+ 49 5131 7095-1333
Fax	+ 49 5131 7095-90
Email	support.rp@lpkf.com
Internet	http://www.lpkf.com/en

In our continuous effort to improve our documentation we are asking you to give us your feedback if you notice any discrepancy when working with the system/product, or if you have any comments or suggestions for improvement.

At the moment of packaging, the system/product has been equipped with the latest software version and with the software and hardware documentation currently valid. By now, new versions of the documentation as well as new software versions might be available.

For all the latest news and updates visit the support area of our homepage:
www.lpkf.com/en/support-services.

Contents

1	Safety	10
1.1	Intended use	10
1.2	Basic warning messages	11
1.3	Responsibility of the operator	12
1.4	Personnel requirements	13
1.5	Personal protective equipment	14
1.6	First aid	14
1.7	Environmental protection	15
2	Product description	16
2.1	Function description	16
2.2	Scope of delivery	16
2.3	Technical data	17
2.4	Storage	18
3	Application	19
3.1	Processing the PCB	19
3.2	Through-hole plating the PCB	22
3.3	Cleaning the PCB	30
4	Appendix	32
4.1	List of figures	32
4.2	List of tables	32
4.3	Index	33

1 Safety

This chapter contains important safety instructions that have to be observed when using the product.

1.1 Intended use

The product can be used for through-hole plating of double-sided and multi-layer printed circuit boards. Drill holes of at least 0.4 mm (~16 mil) and an aspect ratio of 1:4 can be metalized.

The following items are also required for using ProConduct:

- ProtoMat system
- Vacuum table
- Extraction system
- Convection oven (with extraction to the outside)

The following protective equipment is required for safe usage of the product:

- Safety glasses with side shields
- Chemical-resistant gloves
- Protective gloves

Improper use

No conventional cleaning agents may be used for removing the oxide layer. Use only the Cleaner supplied in the scope of delivery.

Do not use Cleaner for cleaning materials not used in this process.

1.2 Basic warning messages

Observe the following safety notes for safe usage of the product:

WARNING

Health hazard by contact with chemicals!

Contact with the chemicals can cause serious damage to health including genetic defects:

Inhaling can irritate/damage nose, throat and lungs.

Skin contact can cause skin irritation and can cause permanent discoloration of skin and mucous membranes in case of prolonged and repeated contact.

Eye contact can irritate the eyes and mucous membranes with smarting and tears.

Ingestion can cause irritation of the mucous membranes, throat, esophagus, and stomach and can cause gastrointestinal complaints.

- ▶ Carefully read the supplied safety data sheets and labels.
- ▶ Work in well-ventilated rooms.
- ▶ Wear your personal protective equipment.
- ▶ Avoid direct contact with the chemicals.
- ▶ Immediately take off clothes that are contaminated with the chemicals.
- ▶ Wash your hands thoroughly after work.

CAUTION

Burn hazard by hot surfaces!

Skin contact with heated PCBs or with the heated convection oven can cause skin burns.

- ▶ Wear personal protective equipment while working.
- ▶ Avoid skin contact with heated PCBs and the convection oven.

1.3 Responsibility of the operator

Operator

The operator is the person/company who operates the system/product themselves for industrial or commercial purposes, or makes it available to a third party for use and has the product responsibility for the safety of the system operator/user, the personnel in general, and other persons present.

Operator's obligations

The system/product is used in the industrial sector. The operator of the system/product is thus subject to the statutory obligations for occupational health and safety.

In addition to the safety instructions in this document, the safety, accident prevention, and environmental protection regulations must also be observed at the system's/product's place of operation.

The following applies in particular:

- The operator must inform himself about the effective industrial safety regulations and determine additional hazards in a risk assessment that result from the special working conditions at the system's/product's place of operation. The operator has to implement these in the form of operating procedures for the operation of the system/product.
- During the total operating life of the system/product, the operator has to check and ensure that the established operating procedures comply with the current state of the rules and standards and adapt them, if necessary.
- The operator has to define clear-cut responsibilities for installation, operation, trouble-shooting, maintenance, and cleaning.
- The operator has to make sure that all persons who are working with the system/product have read and understood this document. Furthermore, the personnel has to be trained and informed about the dangers on a regular basis.
- The operator has to provide the required personal protective equipment and instruct the personnel to wear it.
- The operator has to instruct the personnel to maintain a clean and tidy workplace. Eating and drinking at the workplace and especially while operating the system/product must not be permitted.

The operator is also responsible to keep the system/product in good working order. Thus, the following applies:

- The operator has to ensure that the maintenance intervals stated in this document are observed.
- The operator has to check all safety devices for proper function and completeness on a regular basis.

1.4 Personnel requirements



WARNING

Accident hazard due to insufficiently qualified personnel!

Insufficiently qualified personnel cannot assess the risks of using the system/product and put themselves and others in danger.

- ▶ Allow only qualified personnel to use the system/product.
- ▶ Keep insufficiently qualified personnel out of the working area.

The different tasks described in this document require different qualifications of the persons who are to perform these tasks.

If no personnel qualifications are listed in the individual chapters of this document, the operating personnel is intended to perform the tasks.

Only persons who can be expected to perform the tasks reliably are authorized to perform the tasks. Persons whose ability to react is impaired e.g. by drugs, alcohol, or medicine, are not authorized.

This document uses the following qualifications for persons for the different tasks.

Qualified electrician

A qualified electrician is able to perform work on electrical systems and to detect and avoid possible dangers on his/her own based on his/her professional training, know-how and experience as well as knowledge of the applicable standards and regulations.

The qualified electrician has been trained for the special field where he/she works and knows the relevant standards and regulations.

Maintenance personnel of the operator

Maintenance personnel are those persons who are designated by the operator to perform simple maintenance tasks (e.g. cleaning the system/product, removing parts from the system/product). The operator has to ensure that the personnel is suited for performing the work.

The maintenance personnel is able to perform his/her work and to detect and avoid possible dangers on his/her own based on his/her professional training, know-how and experience as well as knowledge of the applicable standards and regulations.

The maintenance personnel has been trained for the special field where he/she works and knows the relevant standards and regulations.

Service personnel

Service personnel are persons who are authorized by the manufacturer LPKF for servicing the system/product. These tasks may only be performed by the LPKF Service.

Operating personnel

Operating personnel trained by the operator is able to perform his/her work and to detect and avoid possible dangers on his/her own based on the training performed by the operator, his/her professional training, and his/her know-how and experience.

The operating personnel has been trained by the operator for the special field where he/she works and knows the relevant standards and regulations.

1.5 Personal protective equipment

Personal protective equipment protects against health or safety risks when working with the system.

During the different tasks of working with the product, personal protective equipment (PPE) has to be worn as specified in this manual.

The following personal protective equipment has to be worn for safe usage of the product:

- Safety glasses with side shields according to EN 166:2001
- Chemical-resistant gloves made of nitrile according to EN ISO 374-1:2016
- Protective gloves according to EN 388:2016+ A1:2018



Safety glasses with side shields

Safety glasses with side shields serve for eye protection in case of flying debris and liquid splashes.



Chemical-resistant gloves

Chemical-resistant gloves protect the hands against immediate skin contact with hazardous substances. Refer to the safety data sheet for the required glove material and thickness.



Protective gloves

Protective gloves protect the hands against friction, abrasions, puncture hazards and deep cuts as well as when touching hot surfaces.

1.6 First aid

If the safety notes and warning messages are observed and the protective equipment is worn, the product can be used safely. If you come into contact with the ProConduct paste or the Cleaner nonetheless, take following measures:

ProConduct paste

After **skin contact**, immediately wash the affected areas with plenty of water and soap. Consult a physician in case of complaints.

After **eye contact**, rinse cautiously with water or eyewash for at least **5 minutes**. In case of complaints, such as pain, aversion to light, or visual impairment, consult a physician.

After **ingestion** of the paste do **not induce vomiting** but drink 1 - 2 glasses of water and consult a physician.

LPKF Cleaner

After **skin contact**, rinse affected areas with water. In case of complaints, consult a physician.

After **eye contact** rinse immediately with plenty of flowing water for approximately 10 minutes holding the eyelids apart and consult an ophthalmologist.

After **ingestion**, rinse mouth and drink plenty of water. In case of complaints, consult a physician.

1.7 Environmental protection

NOTICE

Environmental hazard by improper handling of substances!

Improper handling of environmentally hazardous substances, especially improper disposal, can cause considerable damage to the environment.

- Take appropriate measures immediately if environmentally hazardous substances are accidentally discharged into the environment. If you are in doubt, inform the appropriate local authorities about the damage and ask for appropriate measures that have to be taken.

The following environmentally hazardous substances are used:**ProConduct paste**

ProConduct paste has a harmful effect on aquatic organisms and must not enter groundwater, surface waters, drains, or the ground/soil. The paste must be specially treated for disposal.

Observe the national and local regulations when disposing of the untreated paste.

The cartridge is dangerous when emptied. Do not dispose of it as domestic waste!

Collect waste separately.

Dispose of contaminated packaging/empty cartridges at your local recycling center.

Waste code	Waste designation
EWC code 08 01 111	Waste paint and varnish containing organic solvents or other dangerous substances.

LPKF Cleaner

The LPKF Cleaner has a harmful effect on aquatic organisms and must not enter groundwater, surface waters, or drains in undiluted form or in large quantities.

Observe the national and local regulations during disposal.



Observe the corresponding safety data sheets when handling chemicals as these contain further relevant information.

2 Product description

This chapter describes the properties of the product.

2.1 Function description

ProConduct is a product for paste through-hole plating of structured PCBs. The process can be used for quick and easy plating of even the smallest holes. It uses a paste that is introduced into the holes and is subsequently cured. The process is used on all holes of the PCB at the same time.

The product has the following additional features:

- quick and easy usage
- minimum hole diameter of 0.4 mm (~16 mil) with an aspect ratio of up to 1:4
- applicable for multi-layer PCBs

2.2 Scope of delivery

The scope of delivery of the product is as follows:

Description	Quantity
Protective gloves	1 pair
Chemical-resistant gloves	1 pack
Screen printing squeegee (60 mm / ~ 2.4")	1
Foam rubber roller	1
LPKF Cleaner (500 ml polysprayer; filled with granulate)	1
Cleaning brush	1
PCB material 35/35 µm (229 mm x 305 mm or 9" x 12")	5
PCB material 18/18 µm (229 mm x 305 mm or 9" x 12")	5
Filter mat	10
Cover film (355 mm x 279 mm / ~14" x 11")	10
LPKF protective film	20
LPKF ProConduct paste in cartridge (3 ml)	6
Empty cartridge	6
Luer lock adapter	6
Hand-operated piston	2
Honeycomb plate (order code: 115890)	1
ProConduct process description (order code: 116279)	1

Table 1: Scope of delivery



Please check if all components belonging to the scope of delivery have been completely delivered.

The following components are required but are not included in the scope of delivery:

- ProtoMat
- Desktop vacuum table (order code: 115878)
- LPKF extraction system (order code: 10033243)
- Convection oven (order code: 115877)

2.3 Technical data

The technical data of the product are as follows:

Data	Value
Maximum base material size	229 mm × 305 mm (9" × 12")
Minimum hole diameter	0.4 mm (15 mil) up to an aspect ratio of 1:4
Number of through-holes per PCB	unlimited
Number of layers	4
Base material types	FR4, RF- and microwave materials (incl. PTFE-based materials)
Processing time (without structuring with ProtoMat)	approx. 60 minutes
Electrical resistance (hole diameter 0.4 - 1.0 mm (~16 mil - ~40 mil) at 1.6 mm (~63 mil) material thickness and 35/35µm copper thickness)	45 mΩ on average with a standard deviation of +/-10 mΩ
Processing temperature	16 °C to 24 °C (60.8 °F to 75.2 °C)

Table 2: Technical data

2.4 Storage

Some components of the product require special storage conditions:

ProConduct paste:

- approx. 6 months shelf life
- Store in original packaging
- Store in the refrigerator at temperatures between 4°C and 7°C (39.2 and 44.6 °F)
- Ensure good ventilation.



Storing in a refrigerator prevents sedimentation of the ProConduct paste.

The ProConduct paste is classified in storage class 10 and can be stored together with products of storage classes 10-13 (if not also classified as storage class 3).

LPKF Cleaner:

- Store at 15 °C to 25 °C (59 °F to 77 °F)
- Keep container tightly closed.
- Keep dry.
- Do not store together with food

The LPKF Cleaner belongs to storage class 13 and can be stored together with products of storage classes 10-13 (if not storage class 3 as well).

3 Application

This chapter describes the following tasks:

- Processing the PCB
- Through-hole plating the PCB
- Cleaning the PCB



To achieve a good result, you should complete the following steps quickly. Note that the ProConduct paste cures when exposed to air, making further steps more difficult. Additionally, oxidation or sedimentation of the paste can cause the through-plating to fail.

3.1 Processing the PCB

Prerequisites

- The PCB material must be dry and free of grease.

Consumables and auxiliaries

- 1 PCB material
- 2 protective films
- 1 foam rubber roller
- 1 soft cleaning brush
- ProtoMat system
- LPKF Cleaner
- Lint-free cloth

■ Creating and processing the PCB

1. Place the base material into the ProtoMat system.
2. Process the base material to produce a PCB.

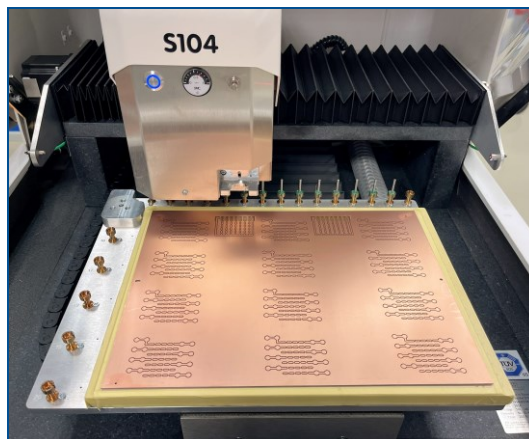


Fig. 1: PCB in ProtoMat system

3. Drill the holes that are not to be through-hole plated in the PCB (e.g. fiducials).
4. Remove the PCB.
5. Clean the PCB with the LPKF Cleaner using a lint-free cloth.

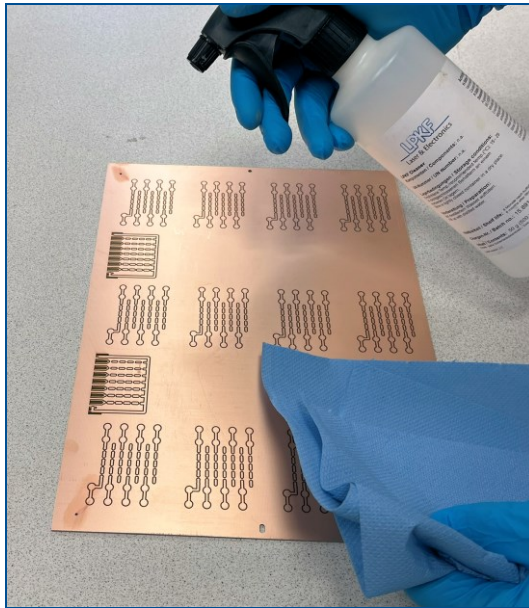


Fig. 2: Cleaning the PCB with LPKF Cleaner

6. Apply the protective film on both sides of the PCB using the foam rubber roller. Ensure that there are no blisters in the protective film.



Fig. 3: Applying the protective film with the foam rubber roller

7. Check whether the fiducials are covered by the protective film and expose them if necessary.
8. Place the PCB into the ProtoMat system.
9. Drill the holes that are to be through-plated through the protective film. Use the same drill pattern as during the first drilling procedure.

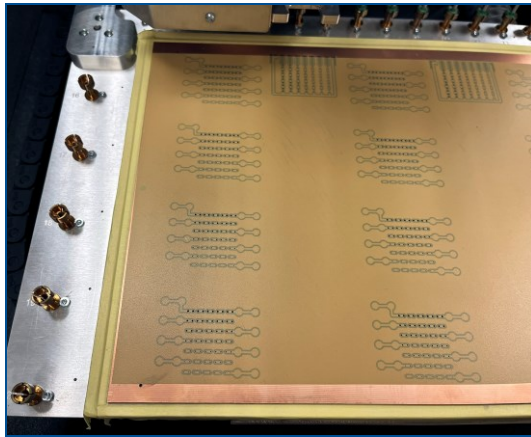


Fig. 4: Drilled holes through protective film

10. Remove the PCB.

11. Check the PCB for burrs and blocked holes:

12. Clean blocked holes using the soft brush or (oil-free) compressed air, if necessary.

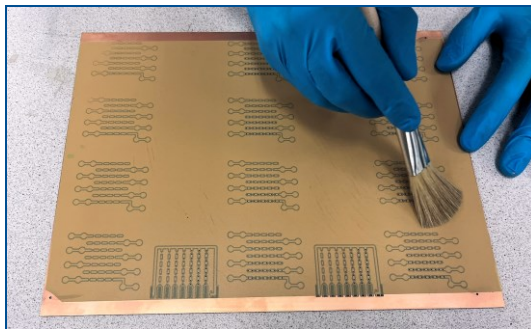


Fig. 5: Checking and cleaning the PCB

☒ The PCB has been created and processed.

3.2 Though-hole plating the PCB

Prerequisites

- PCB has been laminated with protective films and has been processed.
- ProConduct paste must have a temperature of 16 °C to 24 °C (60.8 °F to 75.2 °C)
- Temperature of the room and the PCB should not be lower than 20 °C (68 °F)

Consumables and auxiliaries

- 1 cartridge ProConduct paste
- 1 empty cartridge
- 2 hand-operated pistons
- 1 luer lock adapter
- 1 cover film
- 1 filter mat
- 1 vacuum table
- 1 screen printing squeegee
- 1 convection oven
- 1 extraction system
- Protective gloves
- Chemical-resistant gloves
- Safety goggles

WARNING

Health hazard by contact with chemicals!

Contact with the chemicals can cause serious damage to health including genetic defects:

Inhaling can irritate/damage nose, throat and lungs.

Skin contact can cause skin irritation and can cause permanent discoloration of skin and mucous membranes in case of prolonged and repeated contact.

Eye contact can irritate the eyes and mucous membranes with smarting and tears.

Ingestion can cause irritation of the mucous membranes, throat, esophagus, and stomach and can cause gastrointestinal complaints.

- ▶ Carefully read the supplied safety data sheets and labels.
- ▶ Work in well-ventilated rooms.
- ▶ Wear your personal protective equipment.
- ▶ Avoid direct contact with the chemicals.
- ▶ Immediately take off clothes that are contaminated with the chemicals.
- ▶ Wash your hands thoroughly after work.

CAUTION

Burn hazard by hot surfaces!

Skin contact with heated PCBs or with the heated convection oven can cause skin burns.

- ▶ Wear personal protective equipment while working.
- ▶ Avoid skin contact with heated PCBs and the convection oven.

Depending on how long the cartridges have been stored, sedimentation may have occurred. It is therefore important to prepare the paste by using the hand-operated pistons. This results in a homogeneous paste.

■ Preparing ProConduct paste

1. First remove the front cap of the ProConduct cartridge

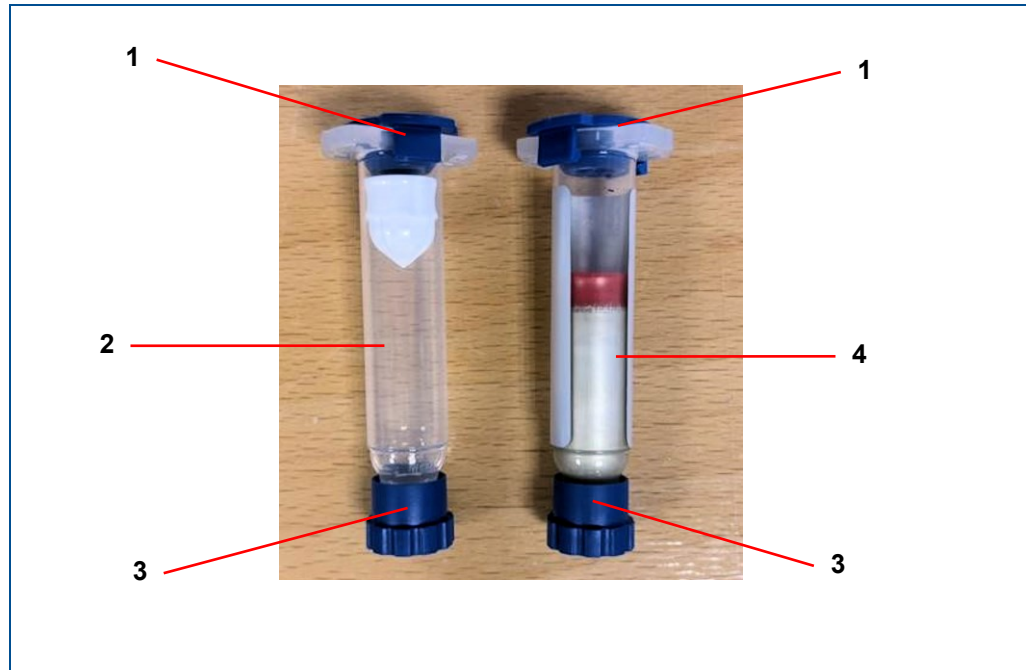


Fig. 6: Cartridges

- | | |
|-------------------|------------------------|
| 1 Sealing caps | 3 Front cap |
| 2 Empty cartridge | 4 ProConduct cartridge |

2. Remove the front cap of the empty cartridge.
3. Connect the ProConduct cartridge with the empty cartridge by inserting the luer lock adapter:

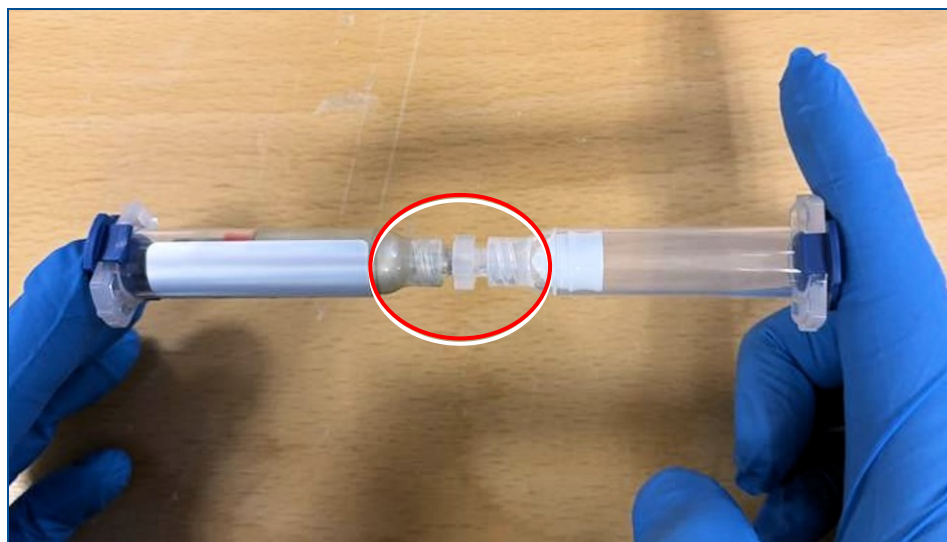


Fig. 7: Luer lock adapter inserted

4. Sealing caps at the cartridges.
5. Insert both hand-operated pistons into the cartridges:



Fig. 8: Hand-operated pistons inserted



Depending on the storage duration of the ProConduct paste and the associated degree of sedimentation, it is necessary to use the hand-operated pistons 20 to 25 times:

6. Alternatingly push the hand-operated pistons and thus knead the paste:



Fig. 9: Using the hand-operated pistons

☐ The paste is homogenized:

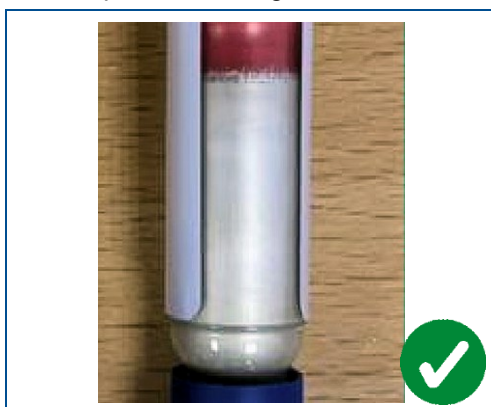


Fig. 10: Homogenized paste

☒ The ProConduct paste has been prepared.

■ Though-hole plating the PCB

1. Place a new filter mat on the vacuum table.
2. Cut a piece of the size of the PCB out of the cover film.
3. Apply the cover film onto the filter mat.

- ☐ The processing area has been prepared.



The cover film serves to increase the vacuum intensity during the process.

4. Put on the chemical-resistant gloves.
5. Place the PCB onto the vacuum table within the cutout.



The PCB must have direct contact with the filter mat! The cover film only covers the area of the filter mat that is not already covered by the PCB.

6. Have your materials at hand:

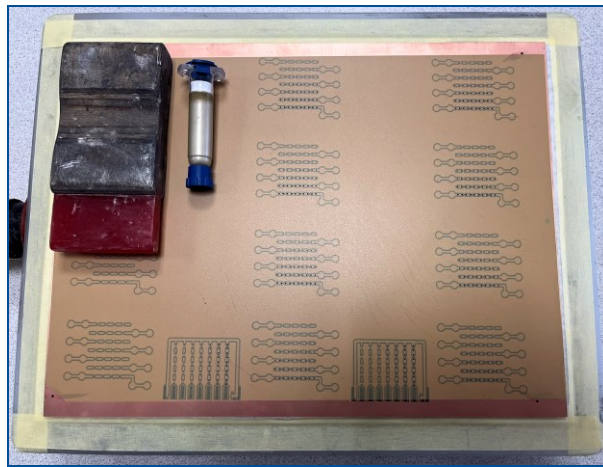


Fig. 11: Required materials

7. Apply the prepared ProConduct paste (see page 23) close to the drill holes you want to plate through.

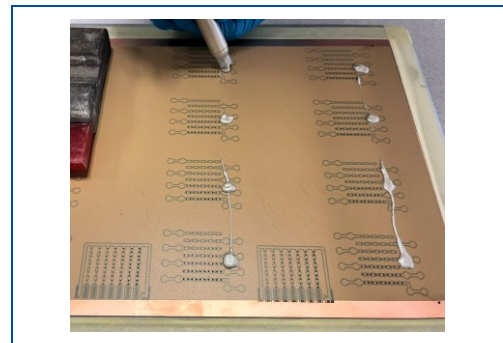
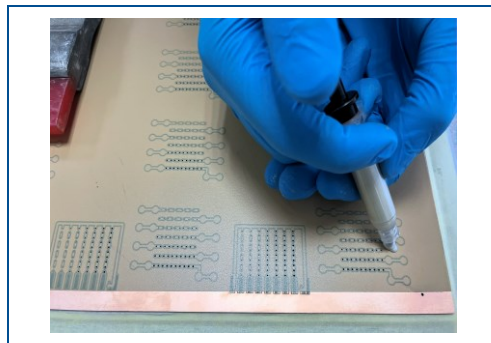


Fig. 12: Applying ProConduct paste

8. Spread the ProConduct paste evenly on the whole surface of the PCB.
Use horizontal and vertical strokes.



Spread the paste immediately! The solvents in the paste dissipate over time which makes spreading more difficult.

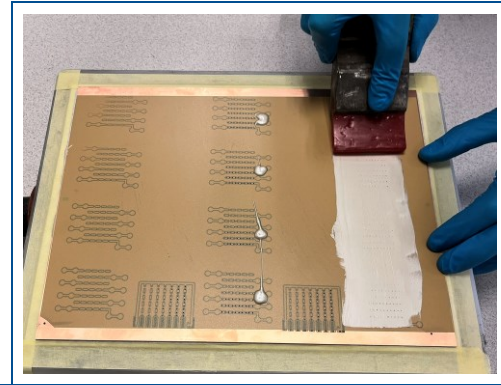
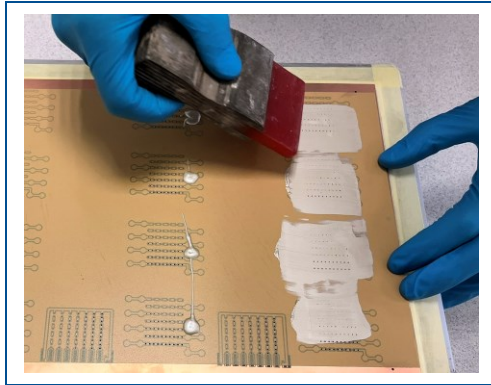


Fig. 13: Spreading ProConduct paste on the PCB

9. Turn the extraction system to the highest setting and wait for at least 30 seconds.



Fig. 14: Drill holes before vacuum



Fig. 15: Drill holes after vacuum

10. Switch off the extraction system.

11. Lift the PCB and check the filter mat for paste that has passed through the holes:

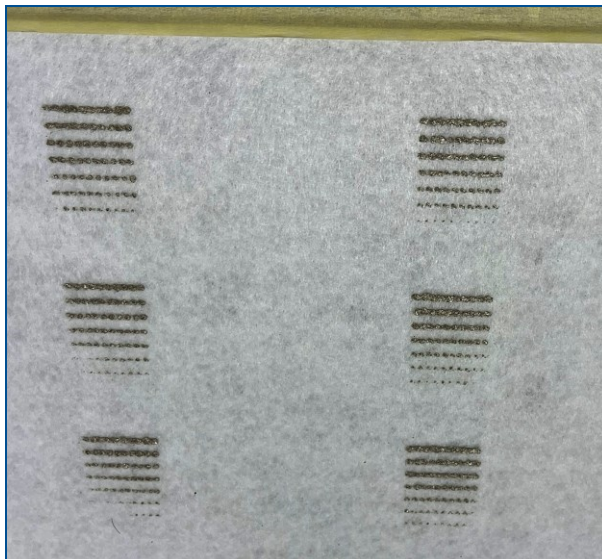


Fig. 16: Exiting paste on the filter mat

12. Turn the PCB over and check for excess paste around the drill hole:

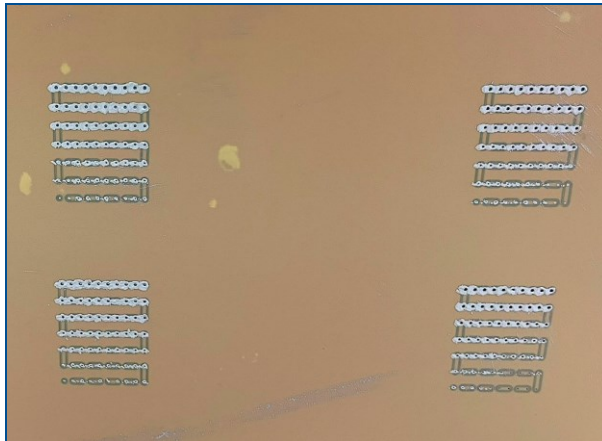


Fig. 17: Excess paste around the drill hole



Excess paste around the drill hole indicates that there is enough paste material in the drill hole. This is important for successful through-plating. If there is no excess paste visible, repeat the steps 6 to 8.

13. Use a squeegee to spread the excess paste around the drill holes.

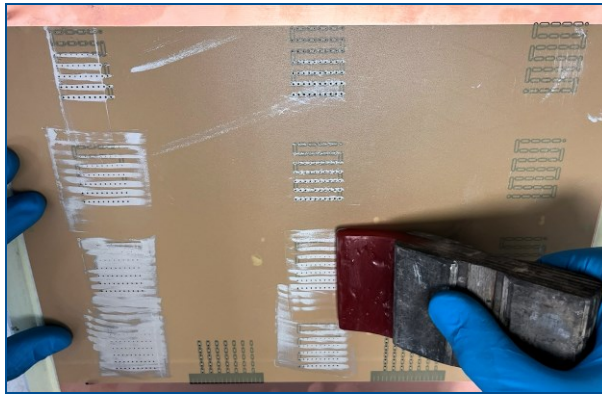


Fig. 18: Spreading excess paste

14. Slowly peel off the protective film of the PCB at an angle of 90° from both sides:

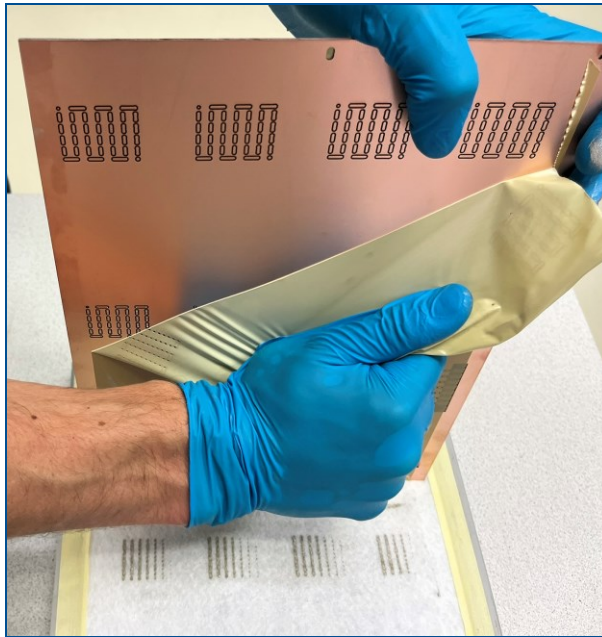
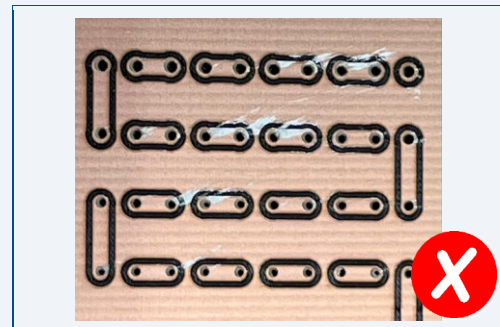
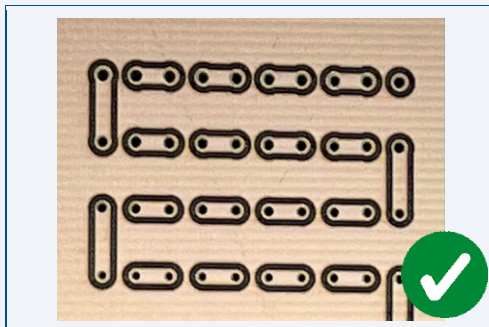


Fig. 19: Peeling off the protective film



Risk of short circuit due to uncontrolled distribution of ProConduct paste!

When peeling off the protective film, make sure to do so in an angle of 90° so that the ProConduct paste does not spread to unwanted areas. This can lead to a short circuit on the PCB later on!



15. Take off the chemical-resistant gloves and put on protective gloves.
16. Turn the temperature of the convection oven to 160 °C (320 °C)
17. Place the PCB horizontally onto a grille and let the PCB cure for approx. 10 minutes.

Burn hazard by hot surfaces!

Skin contact with heated PCBs or convection oven can cause skin burns.

- ▶ Wear your personal protective equipment during work.
- ▶ Avoid skin contact with heated PCB and convection oven.

18. Remove the PCB and let it cool down to room temperature.

- ☒ The PCB has been through-hole plated.

**Oxidation on PCBs**

Contact with liquids (e.g. ProConduct paste) creates an oxide layer on the PCB. This layer impairs the mounting (e.g. by soldering) of other components on the PCB. For more information on removing the oxide layer, refer to page 30.

Additionally, oxidation impairs the conductivity of the material because the contact resistance is increased up to three times its value.



The used tools and accessories can be cleaned with isopropyl alcohol.

3.3 Cleaning the PCB

Prerequisites

- The PCB must be at room temperature.

Consumables and auxiliaries

- 1 spray bottle LPKF Cleaner
- 1 soft cleaning brush
- Chemical-resistant gloves
- Oil-free compressed air

■ Cleaning the PCB

1. Put on the chemical-resistant gloves.

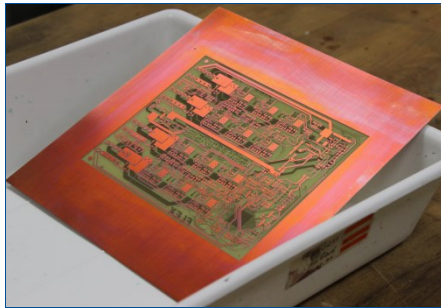


Fig. 20: PCB with considerable oxide layer

2. Spray LPKF Cleaner onto both sides of the PCB.
3. Use the cleaning brush (if necessary) to work in the LPKF Cleaner until the oxide layer has been removed.

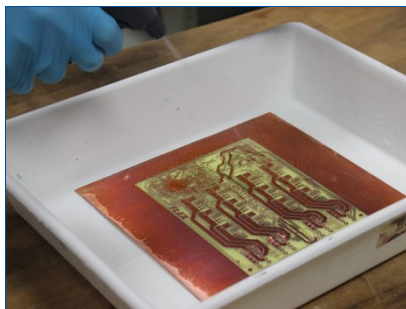


Fig. 21: Spraying LPKF Cleaner onto the PCB

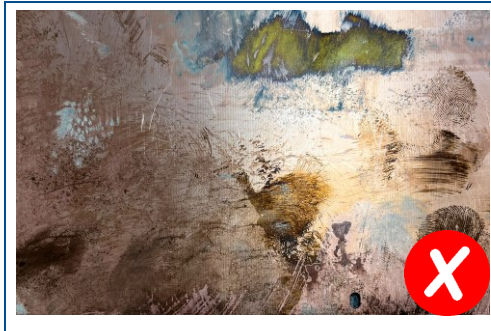


Fig. 22: Oxide layer present

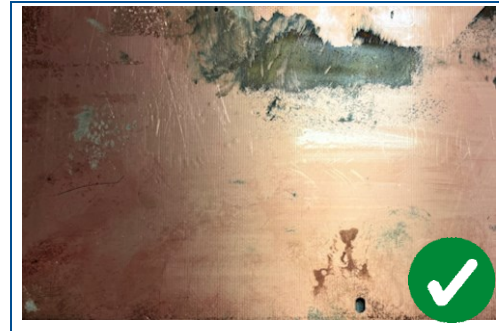


Fig. 23: Oxide layer removed

4. Rinse the PCB thoroughly with running water.
5. Dry the PCB with oil-free compressed air.



The PCB should be dried quickly to prevent renewed oxidation.

- ☒ The PCB has been cleaned.



Always wear nitrile gloves for the next steps, so that no fingerprints are left on the PCB. This causes renewed oxidation!

4 Appendix

This chapter contains navigation elements of the document.

4.1 List of figures

Fig. 1:	PCB in ProtoMat system	19
Fig. 2:	Cleaning the PCB with LPKF Cleaner	20
Fig. 3:	Applying the protective film with the foam rubber roller	20
Fig. 4:	Drilled holes through protective film	21
Fig. 5:	Checking and cleaning the PCB.....	21
Fig. 6:	Cartridges	23
Fig. 7:	Luer lock adapter inserted	23
Fig. 8:	Hand-operated pistons inserted	24
Fig. 9:	Using the hand-operated pistons	24
Fig. 10:	Homogenized paste.....	24
Fig. 11:	Required materials	25
Fig. 12:	Applying ProConduct paste	25
Fig. 13:	Spreading ProConduct paste on the PCB.....	26
Fig. 14:	Drill holes before vacuum	26
Fig. 15:	Drill holes after vacuum	26
Fig. 16:	Exiting paste on the filter mat	26
Fig. 17:	Excess paste around the drill hole	27
Fig. 18:	Spreading excess paste	27
Fig. 19:	Peeling off the protective film	28
Fig. 20:	PCB with considerable oxide layer	30
Fig. 21:	Spraying LPKF Cleaner onto the PCB	30
Fig. 22:	Oxide layer present	31
Fig. 23:	Oxide layer removed	31

4.2 List of tables

Table 1:	Scope of delivery	16
Table 2:	Technical data	17

4.3 Index

C		P	
chemical-resistant gloves	14	protective gloves	14
customer service	7		
L		Q	
limited liability	6	qualified electrician.....	13
List of figures.....	32		
List of tables.....	32	S	
LPKF Service	7	safety glasses with side shields	14
		service personnel	13
O		W	
operating personnel	13	warranty	7

LPKF Laser & Electronics SE
Osteriede 7
30827 Garbsen
Germany

Phone: +49 5131-7095-0
Fax: +49 5131-7095-90

Email: info@lpkf.com