

Selective Dip Soldering



Flexibel with
quick changeable nozzles

High productivity:
“One dip for all solder joints”

Applicable even
with small
soldering areas

Principle

Selective dip soldering is a derivate of the dip soldering method which was used at the beginning of PCB-production before wave soldering machines were used. The conventional wave and dip soldering method covers the complete soldering side of PCB's. With selective soldering only defined areas are exposed to liquid solder. Wolf offers three methods for selective soldering:

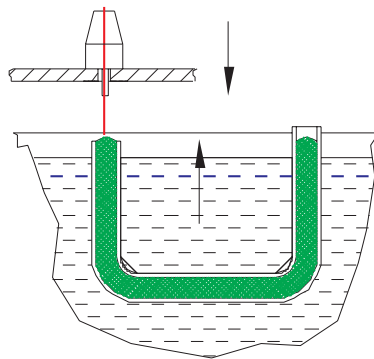
- Dip soldering with nozzles
- Miniwave in-flow
- Miniwave external flow.

This product information concerns the first principle.

Process-sequence:

1. Application of flux by spraying, dipping or micro drop application.
2. Preheating by convection (hot air) or infrared radiation
3. Soldering by dipping the PCB into the nozzles

Selective dip soldering



Single nozzle with Radius $r=2.5$ mm

The workpiece is dipped towards the nozzles. On the nozzles is a solder depot with convex surface (solder drop). To keep the size of the solder drop constant the principle of "communicating tubes" is applied. In this way the size and form of the solder drop is independent from the solder level in the solder bath.

However the speed of the upward movement of the nozzle is an important parameter.

Before the nozzles lift up out of the solder bath, the surface must be clean and free of oxide. The lifting of the nozzle and the dipping of the PCB must be coordinated movements within a short time. The duration must be short to prevent oxidation of the solder surface and cooling down of the solder inside the nozzle.

The distance between the nozzle and the PCB surface has a great influence on the soldering quality. This dimension must be kept constant. Therefore a precise and robust machine mechanics are essential.

Flux application

By **Spraying of flux** very thin flux layers can be applied. If the fluxed area must be precisely limited, masks as cover must be used. These masks must be cleaned regularly.

Flux can be applied according the same principle as ink-jet printers work. The application by **micro-drop** brings very small amounts of flux precisely to the solder spot. No masks are necessary. However the flux layer is not as thin as it is possible with spraying.

Preheat

Convection heating with hot air is the best method to preheat the complete PCB. With this method the heat time is quite long and it is difficult to shield some areas which are heat sensitive.

With **high-power halogen lamps** the PCB is heated up rapidly through infrared radiation. With masks it is easy to shield some areas which are heat sensitive.

Application

On many PCB's with surface mount components there are still some through-hole components left. They can not be soldered in the standard reflow soldering process. If these components are distributed on different places on the PCB, selective dip soldering is the superior methode.

Selective dip soldering needs only an area of 1.5 mm around the solder spot, which is free of neighboring components.

Nozzles with a diameter of as small as 5 mm are possible.

Quick-changeable nozzle sets make this solder methode flexible for different products.



PCB with 9 solder joint in different locations distributed on the board

Selective dip soldering is ideal for tinning of coated wires of coils as well as flex wires. For coated wires solder temperatures of more than 400 °C are often necessary to melt the coating. Miniwaves become critical with such high temperatures and need a nitrogen atmosphere.



Dip soldering of coated wires

Advantages

... Compared to point-to-point soldering (Iron soldering, laser soldering)

- + Significant higher productivity (Many solder joints can be soldered in one step)
- + High and more constant soldering quality
- + Easy set up of the soldering process

... Compared to selective soldering with miniwave

- + Higher productivity if the solder joints are placed in different locations distributed on the board
- + Smaller free area around the solder spot necessary
- + Less complex motions necessary
- + Nitrogen atmosphere no must

Maschinen

Wolf selective soldering machines can have different structures:

- fully automatic in-line soldering cells
- stand alone soldering cells with manual loading.

All Wolf machines base on standardized Wolf production modules (see separate product info "Production Modules").

Depending on the specific soldering task Wolf laser soldering machines are custom made rather than multi purpose.

All machine components are maintenance free as far as possible.

The solder-bath is die-casted. Mechanical components are robust. The solder-baths have a good temperature insulation for safety. High power heaters give short heating times below one hour from room temperature.

Wolf selective soldering systems feature:

- Robust structure and outstanding design
- Miniwave nozzles with nitrogen flow around
- Programmable precision linear axis for the Handling of the PC-Boards and the movement during soldering
- Soldering nozzles quick changeable
- Modulare structure
- Integrated solder fume extraction
- Automatic level control of the solder bath
- Control of all soldering parameters

Example 1

Synopsis of custom-made machine:

- Product: PCB for amplifier with 4 through-hole solder joints
- Dip soldering system with 4 nozzles (Diameter 5 mm)
- Cycle time: 6 s per PCB
- Flux positions programmable
- Preheating with infrared radiation from a halogen lamp
- In-line machine with free flowing pallet conveyor
- Human machine interface with text display and touch panel.



Flux station with flux-jet system



Preheating by infrared radiation of a halogen lamp with temperature control

For more application examples, please see our website



Example 2

Synopsis of custom-made machine:

- Product: Stepper-motor, Soldering of coated wires to 4 pins
- Cycle time: < 2.5 s
- In-line system mit micro transfer system, size of workpiece-carriers 50x50 mm
- 2 solder-baths. Dip soldering under nitrogen atmosphere
- Dip level and dip velocity programmable
- Flux application by dipping into flux nozzles
- Preheating with hot air
- Human machine interface with text display and touch panel.



wolf
PRODUKTIONSSYSTEME

Robert-Bürkle-Strasse 6
72250 Freudenstadt

Telefon 07441-8992-0
Telefax 07441-8992-22

E-Mail:
Info@wolf-produktionssysteme.de

Website:
wolf-produktionssysteme.de

Special Soldering

**Assembly
Automation**