PiNK®

SOLDERING TECHNOLOGY

WE LOVE TECHNOLOGY.
WE BUILD SYSTEMS.
WE ARE PINK.

PINK GmbH Thermosysteme is a leading family-owned company based in Wertheim-Bestenheid, Germany, which is characterized by its outstanding expertise in the development and manufacture of customized systems in the fields of vacuum soldering technology, silver/copper sintering technology, drying technology and low-pressure plasma technology. All our systems are specifically tailored to the requirements and products of our customers.

HIGH QUALITY

Well-known technology companies from the automotive industry and its suppliers, the semiconductor industry, the electronics industry and the chemical and pharmaceutical industries, among others, have been trusting in our reliable systems – made in Germany – for decades.

SEMIKRON DANFOSS · OSRAM · Infineon · vitesco TECHNOLOGIES · Boehringer Ingelheim

INNOVATIVE

We are a multiple award-winning "Top Innovator" in the TOP 100 German Innovation Competition and hold numerous national and international patents for our technological innovations. We are a driving force for progress and innovation, as well as a reliable partner and pioneer for the sustainable technologies of tomorrow.

INTERNATIONAL

PINK supplies plants and systems worldwide. Numerous representatives in all major markets guarantee optimum advice, project support, assistance with commissioning and competent on-site service at all times.

CONSTANT GROWTH

We are growing unstoppably. The focus is on product optimization and customer orientation. This is ensured by over 200 dedicated employees. On a production area of 12,200 square meters with in-house production, machining and assembly as well as our own building for the development and application departments for our products, we offer our customers complete expertise.

SOLDERING TECHNOLOGY

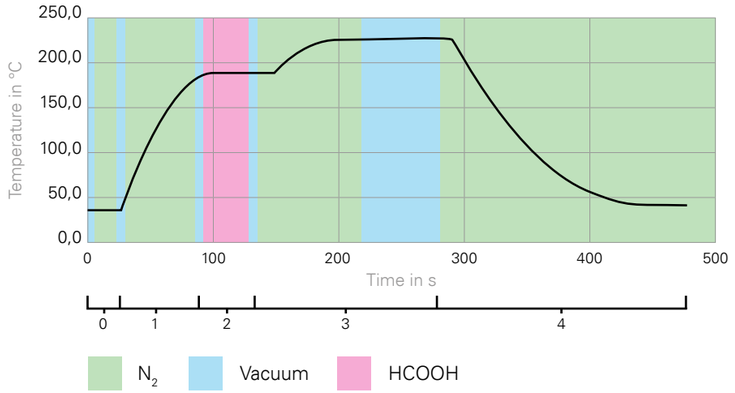
PIONEER IN VACUUM SOLDERING

25 YEARS OF PROVEN QUALITY AND KNOW-HOW

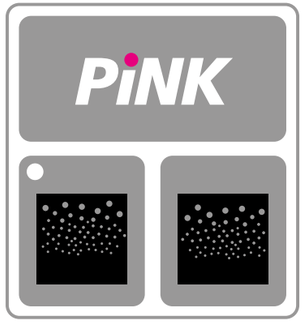
Global players in the field of power electronics manufacturing require power electronic components and assemblies, such as IGBTs or MOSFETs, of the highest quality. In order to keep pace with the ever-increasing performance classes and requirements in terms of life cycle, reliability and thermal load capacity, the power modules as a whole must meet these highest demands. Therefore, in addition to the solder connection of the semiconductor to the ceramic substrate, the solder connection of the module to a baseplate or heat sink and the top side contacting of the semiconductor must also meet these high requirements.

With our world-renowned and proven vacuum soldering systems of the VADU series, particularly reliable and void-free solder connections can be achieved, e.g. of large-area power modules with preform solders and / or pastes.

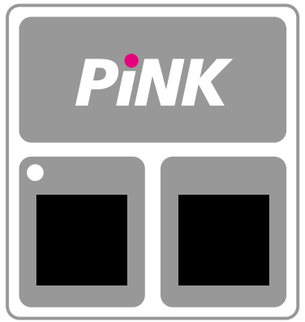
PROCESS OVERVIEW FOR PREFORM SOLDERING WITH FORMIC ACID



STEP 0 Preperation
STEP 1 Heating
STEP 2 Cleaning process with formic acid
STEP 3 Soldering with vacuum
STEP 4 Cooling



After chip soldering without vacuum process



After chip soldering with vacuum process

AREAS OF APPLICATION

- Automotive (e.g. charging technology, drive technology)
- Semiconductor industry / Power semiconductors (SiC, Si, GaN)
- Power electronics
- Optical and electro-optical industry (power LEDs)
- High frequency technology
- Wafer technology
- Railroad drive technology
- Solar technology
- Wind turbine technology

Aerospace

Renewable Energy

Communication

Energy Transmission

E-Mobility & Transportation

Power LEDs

PINK EQUIPMENT AND SYSTEMS FOR VOID-FREE SOLDERING WITH VACUUM

PINK offers flexible soldering technologies for every production strategy: We supply laboratory systems for development and small series production as well as customized modular inline soldering systems for series production. All vacuum soldering systems for preform and/or paste soldering under an inert soldering atmosphere can be equipped with various customized options according to individual customer requirements.

MODULAR DESIGN

FLEXIBLE MODULES, FLEXIBLE OPTIONS

The modular system concept is based on modules that are individually configured, built and connected together during final assembly. Here, 2 to 5 modules (preheating/heating/soft cooling/cooling) can be easily combined.

This offers our customers a high degree of flexibility in the system configuration with many functions and options (e.g. formic acid equipment) as well as simple subsequent expansion of the system to increase throughput and productivity by adding modules. In addition, the vacuum soldering module can be replaced with a sintering module if required, depending on the desired choice of connection technology. The individual modules also have the advantage of being easy to transport and insert into the production line.

INTELLIGENT TEMPERATURE MANAGEMENT

At process temperatures of up to 400 °C, the VADU systems have short heating and cooling times with controlled gradients. Depending on the product, high heating and cooling rates of more than 5K/sec can be achieved. In addition, temperature stability is ensured during evacuation. The temperature is always precisely controlled via a permanent connecting, infinitely adjustable heating and cooling plate, whereby the substrate temperature is constantly monitored and controlled. This process delivers ideal soldering processes with short cycle times, fast soldering results and high throughput.

PROCESS CONTROL AND TRACEABILITY

Soldering profiles can be individually defined for all systems in the VADU series and controlled and monitored through permanent product tracking and status checks. As all parameters are freely selectable, this opens up infinite degrees of freedom for process design.

In addition, continuous monitoring takes place during the soldering process so that all process data can be fully traced at all times. Due to continuous process control and traceability through continuous recording of all important process parameters, the reproducibility of the soldering processes is guaranteed and a consistently high product quality is ensured. Of course, the process data can be sent to a production control system (MES) and is then available to the customer for further data processing.

USER-FRIENDLY INTERFACE

The intuitive and user-oriented visualization – made by PINK – enables clear and simple operation of the system and also includes extensive and useful additional functions.
For example, the integrated process archive enables rapid process development, the continuous improvement of process quality and throughput.

ECO-FRIENDLY, SUSTAINABLE AND ERGONOMIC

The professional designed VADU soldering systems consume little space, energy and media. This makes them both economically and ecologically efficient in 24/7 operation.
The low energy and gas consumption enables environmentally friendly and resource-efficient soldering. Our systems are sustainable: thanks to their high quality, they have an above-average service life of well over 10 years. Thanks to its ergonomic and modular design, the VADU also offers advantages in terms of operation, service and maintenance through quick and easy access to the modules.

SYSTEM FEATURES OF OUR SOLDERING SYSTEMS

- Void-free solder connections
- Soldering with preforms and / or pastes
- Modular design with flexible expansion options
- Individual, easy and free programmable soldering profiles
- Process temperatures up to 400 °C (standard)
- Controlled temperature gradients
- Short cycle times
- Formic acid process for flux-free soldering
- Condensate separation
- Controlled & oxygen-free atmosphere in all chambers and from the start of the process
- Inert protective gas atmosphere
- Residual oxygen content < 5 ppm
- Precisely controllable vacuum and gas processes
- Reproducibility of soldering results
- Continuous process control and traceability
- Ethernet interface
- Remote maintenance (VPN)
- Low energy and media consumption

NEW UPGRADES FOR MODULAR VADU SOLDERING SYSTEMS

In addition to the well-known and proven options, such as the automatic downholder system, product-specific carriers and baseplates, additional heating systems such as ceiling heating or infrared ceiling heaters, the following new options are now also available:

PIN HEATING AND PIN COOLING SYSTEM

PINK offers the patented pin heating and pin cooling system for soldering and cooling components with complex 3D geometries, such as PinFin cooler or highly curved baseplates. The heating and cooling module has a special heating and cooling plate with integrated spring-loaded pins that adapt to the geometry of the customer's product. This compensates for tolerances and warping of the customer's products and enables more efficient, homogeneous and localized heating and cooling of the product.

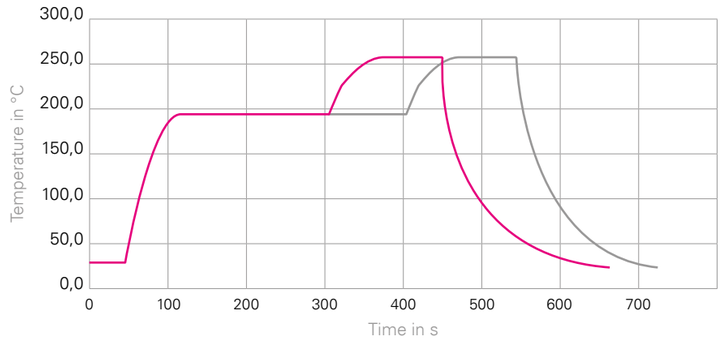
FORMIC ACID EQUIPMENT WITH FULLY AUTOMATIC BUBBLER REFILL SYSTEM

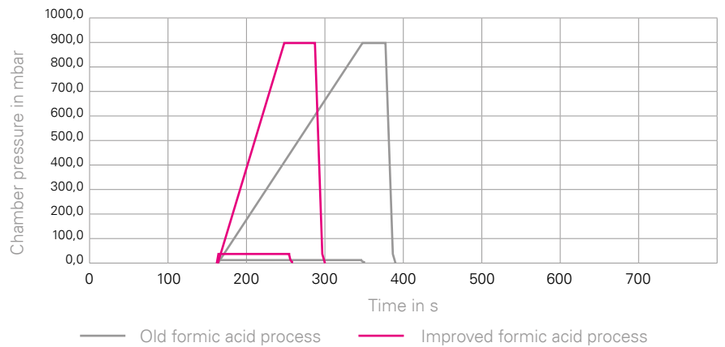
Formic acid is used during the process to clean oxidized product surfaces and to improve wettability during flux-free soldering. The powerful formic acid system can be expanded with a newly developed bubbler filling system. The fully automatic bubbler filling system facilitates the handling of formic acid and enables oxygen-free automatic filling during ongoing soldering processes. The system therefore no longer needs to be stopped to refill or replace the bubblers.

LESS TIME, LOWER COSTS, MORE SAFETY – CONVINCING ADVANTAGES OF THE BUBBLER REFILL SYSTEM

- Higher system availability and therefore more throughput:
  Increase in productivity by up to 15% (using the VADU 400XL as an example)
- No system downtime due to refilling or bubbler replacement
- Greater process reliability: oxygen-free filling
- Protection of the production facility: no acid handling in the clean room
- Occupational safety: No hazards for staff due to manual filling
- Elimination of external service providers for filling/bubbler handling
- Self-venting system

OPTIMIZED FORMIC ACID PROCESS: 50% REDUCTION IN FLOODING TIME





OPTIMIZED HEATING MODULE NEW FLUX MANAGEMENT FOR “ZERO-FLUX RESIDUES”

With the optimized and patented heating module of our modular VADU series, the new flux-free solder pastes can now also be used.

Thanks to the advanced heating technology in combination with the clever, integrated flux management, residues on the product can be reduced by up to 100% using the “zero-flux residue” solder paste technology.

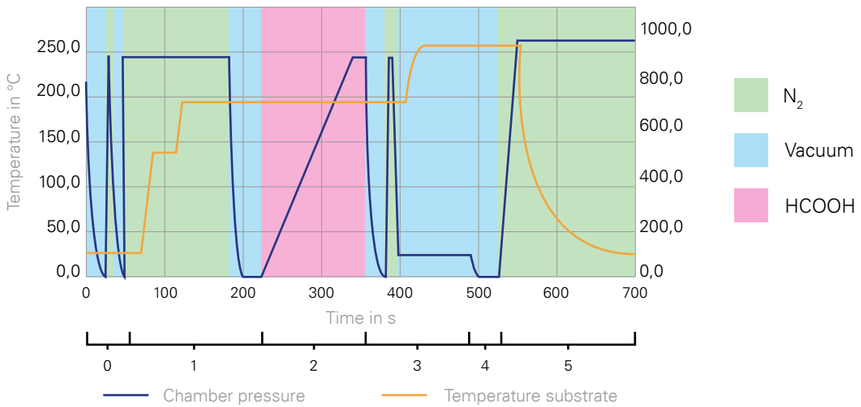
The flux residues in the heating chamber are collected at an easily accessible point in the system. This enables fast and safe maintenance and cleaning of the system without long downtimes, thus increasing system availability and productivity.
In addition, time-consuming and cost-intensive downstream wet-chemical cleaning processes are no longer necessary.

Our decades of experience with PINK vacuum chamber technology offer countless options for gas processes, a controlled and oxygen-free atmosphere and formic acid technology for this soldering process in particular – for maximum throughput with the highest quality solder joints.

RECOMMENDED REFLOW PROFILE FOR ZERO-FLUX-RESIDUE SOLDER PASTE

SOLDERING PROFILE

STEP 0 Process preparation
STEP 1 Preheating + evaporation of solvents & tixotropic agents (can be controlled by heating ramp and pressure level)
STEP 2 Cleaning process with formic acid
STEP 3 heating up to peak temperature + evaporation of cross-linkers (can be controlled by heating ramp and pressure level)
STEP 4 Reflow with vacuum enhanced void reduction
STEP 5 Cooling



SYSTEM OVERVIEW

	VADU 100	VADU XL modular	VADU XXL modular
Type of system	Batch system	Inline system (VADU 200 as batch system)	Inline system (VADU 200 as batch system)
Number of vacuum chambers	1 chamber with 2 separate process zones	2 - 5	2 - 5
Process area (W x D)	168 x 280 mm	410 x 280 mm	600 x 280 mm
Clearance height	max. 50 mm	max. 100 mm	max. 100 mm
Vacuum (standard)	≤ 2 mbar	≤ 2 mbar	≤ 2 mbar
Dimensions of the VADU (W x D x H)	1,070 x 1,130 x 1,150 mm	1,758 x 1,910 x 2,015 mm (VADU 200) Width for each additional module: +678 mm	1,758 x 1,910 x 2,015 mm (VADU 200) Width for each additional module +908 mm
Position of pumping unit	integrated	beside the VADU / customized	beside the VADU / customized
Power supply	3 x 400 V, 50/60 Hz	3 x 400 V, 50/60 Hz	3 x 400 V, 50/60 Hz
Power input		Depending on equipment	
SMEMA interface	–	✓	✓
Process and product trace	✓	✓	✓

SYSTEM OVERVIEW

	VADU 100	VADU XL modular	VADU XXL modular
OPTIONS			
Process temp. up to 500 °C	✓	✓	✓
Induction heating	✓	✓	✓
Pin Heating / Pin Cooling	✓	✓	✓
Top side ceiling heating / IR heater system	✓	✓	✓
Formic acid equipment	✓	✓	✓
Automatic bubbler refill system for formic acid	–	✓	✓
Heating module – zero-flux residues	–	✓	✓
Compatibility with sintering module	–	✓	✓
Downholder	manually	manually / automatic	manually / automatic
Product carriers / baseplates	standard + customized	standard + customized	standard + customized
Measuring carrier / data logger	✓	✓	✓
MES-interfaces (e.g. SECS/GEM)	✓	✓	✓
DMC codes for product carriers for traceability	✓	✓	✓
Handling- / transfer systems	✓	✓	✓
High vacuum	✓	✓	✓

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