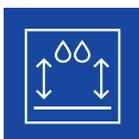




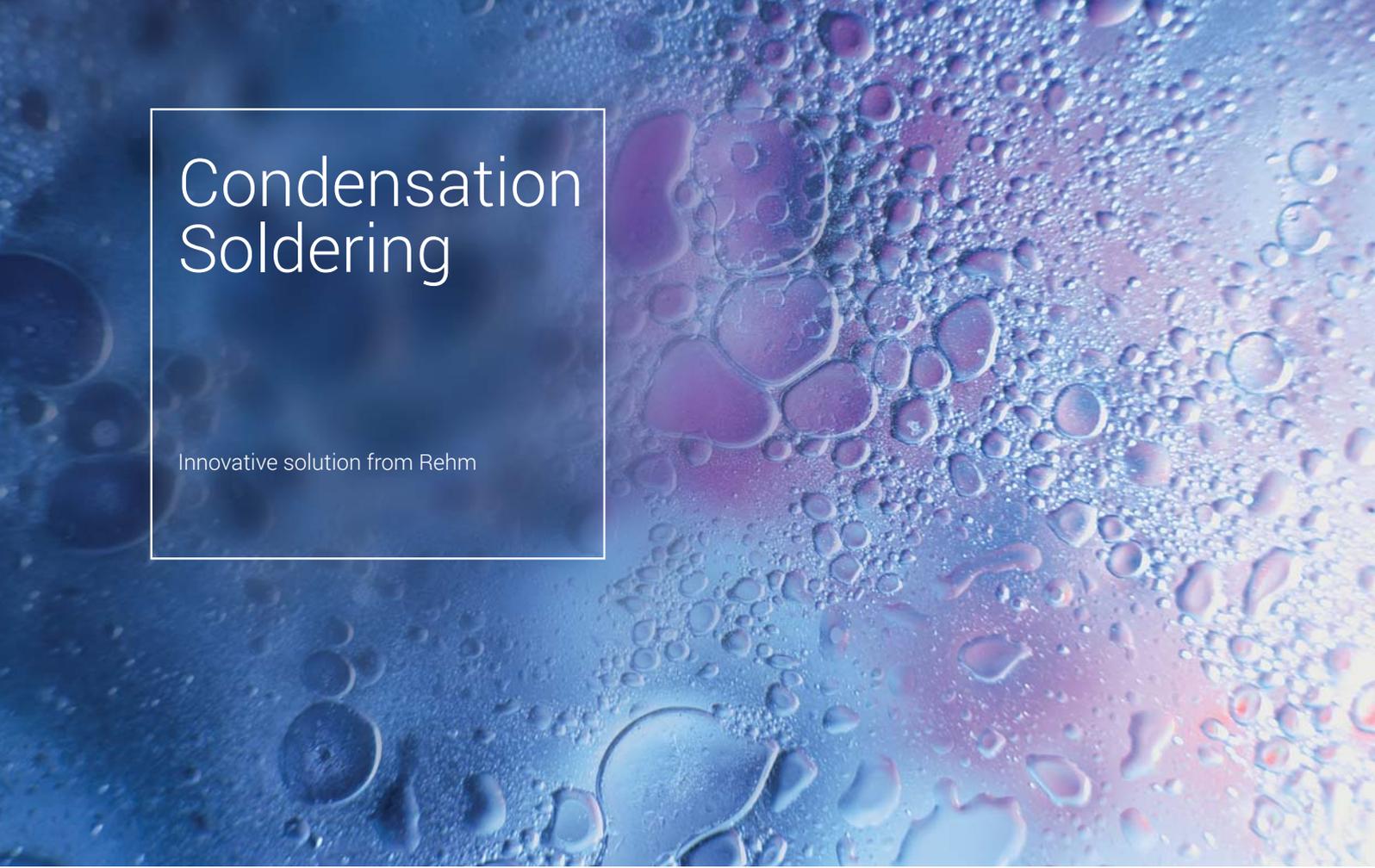
THERMAL SYSTEMS

# Reliable processes with and without vacuum

Reflow Condensation Soldering with unique technology benefits



CondensoXC  
Condensation Soldering



# Condensation Soldering

Innovative solution from Rehm

## CondensoXC – a patented principle with clear-cut advantages

**The Condenso technology opens up much greater flexibility in the condensation soldering process than is achievable through conventional methods. A more precise and wider range of reflow profiling is made possible by using the injection technique and controlling both temperature and pressure (vacuum).**

During condensation soldering, also known as vapour phase soldering, the latent heat released through the change of state from vapour to liquid is used to heat a component. The temperature always remains constant as the heat transfer fluid changes state (state transition). As a result, the maximum temperature of the component will not exceed the heat transfer fluid's (Galden®) boiling point, or its condensation point.

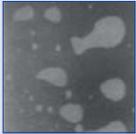
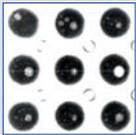
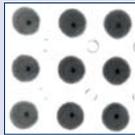
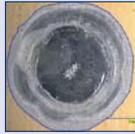
The soldering process takes place in an enclosed process chamber. Through releasing heat during condensation, the vapour enables highly effective heat transfer to the solder. Furthermore, the maximum solder temperature is limited by the heat transfer fluid's boiling point, therefore preventing components from being damaged through overheating.

Our CondensoX-Series can solder even the most difficult assemblies quickly and dependably, at temperatures up to 240 °C. In order to improve control of the condensation phase, Rehm has developed a patented injection process that allows the soldering procedure to be individually regulated. A vacuum module ensures void-free soldered joints – directly after the melting of the solder alloy or as a pre-vacuum. Our systems let you adjust all parameters, such as pressure or temperature, flexibly – for the best soldering results that exactly match the requirements of your manufacturing.

# Why vacuum?

## Reliable, reproducible solder joints

The vacuum technology of CondensoX finds its use in a wide variety of processes. In drying and bonding processes, the oxidation is reduced and during reflow soldering the reliability of the solder joints is increased by reducing the voids.

without vacuum		with vacuum
	<b>Wetted surface area up to 99 %</b>	
	<b>Improved filling of micro vias and THD-solder joints</b>	
	<b>Minimum of voids</b> (particularly important on power electronics)	
	<b>Improved wetting</b>	

- › Injection principle (repeatable control of the reflow profile)
- › Hermetically sealed process chamber
- › Controllable vacuum process – pre-vacuum and vacuum after soldering possible
- › Manual loading from frontside
- › No Galden® loss, active Galden® filtering
- › Optional process monitoring (traceability) with the wireless WPS-system

# Stable processes for best possible soldering results

## Manual loading

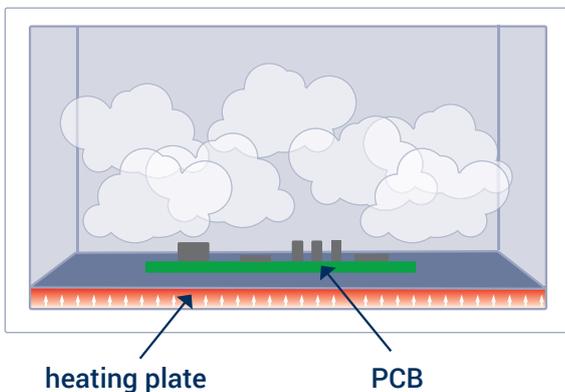
### Placing the assembly on the internal goods carrier from the front side

The operation of the CondensoxC is performed from the front side. The modules can be placed and removed in a simple manner to the internal goods carrier. The product carrier is mounted on a rail system, which ensures a simple and complete access to the workspace.

After the goods carrier has been inserted into the system, the process can be initiated. The bulkhead closes the system and the process is started according to the stored profile. The clearly structured control terminal allows easy selection and preparation of any number of soldering recipes.

## Process chamber

A defined quantity of an inert fluid (usually perfluoropolyether) is vaporized during reflow soldering in the process chamber, which is hermetically sealed. The vapor allows for extremely effective heat transfer to the PCBs due to the release of heat during condensation, while the temperature of the medium remains constant. In addition to this, the medium's boiling point limits the maximum soldering temperature so that the components cannot be damaged due to overheating. This, as well as the ability to control the volume of injected liquid, makes it possible to precisely adjust the reflow profile of the assembly. Flawlessly reproducible soldering conditions are thus guaranteed, which increase the process stability.



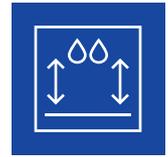
### Reliable vacuum processes for more quality

The applied temperatures of up to 240 °C are an optimal solution for void free applications. For your production our system CondensoxC not only offers advantages for the soldering process, but also for thermal processes (i.e. glue curing).



# Clever system engineering

## efficient and sustainable



### Cooling zone

#### Efficient cooling in inert atmosphere as well

After the soldering process, the assembly is cooled by convection. In the cooling chamber, with the assistance of vacuum, the soldered material is cooled to the required temperature. After cooling the bulkhead opens automatically and the product carrier can be completely pulled out on a rail for easy unloading.

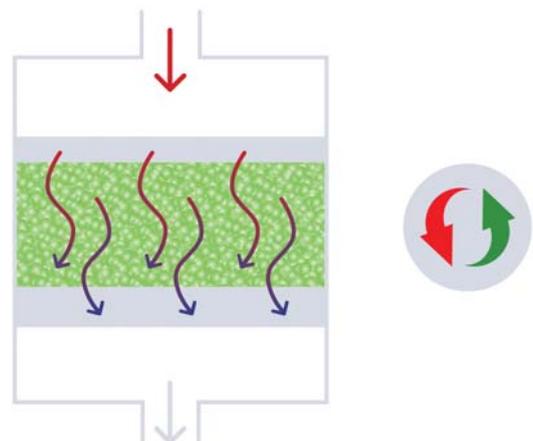


### Medium recycling

#### Reduced medium consumption – sustainable and efficient

The exhausted Galden® is filtered and impurities are removed. Afterwards the cleaned fluid is placed at the disposal at room temperature for further soldering processes in a tank. Due to the fact that the process chamber is hermetically sealed, only minimal loss results from vaporization during the soldering process. Medium consumption, as well as costs, are thus significantly reduced.

- › Minimal loss results from vaporization in the process chamber
- › Fluid filtering and recycling
- › Drastic reduction of fluid consumption
- › Environmentally friendly



# Data and facts:

## An overview of CondensoXC

### Technical specifications

#### OPERATING DATA

Maximum noise level:	72 dBA
Room temperature:	between 15 °C and 32 °C
Humidity:	between 30 % and 75 %

### Dimensions and weights

#### SIZE

Lenght/Width:	1850 x 1250 mm
Height without traffic light:	1400 mm
Required area:	2,3 m <sup>2</sup>
Weight:	1050 kg

#### HEATING

Max. heating temperature:	280 °C
Max. soldering temperature:	240 °C

#### PROCESS CHAMBER

Lenght/Width:	590 x 600 mm
Load dimension:	500 x 500 mm
Warm up time:	approx. 45 min
Temperature accuracy:	profile longitudinal and lateral: +/- 2 Kelvin
Control accuracy:	±1 Kelvin

#### LOADING BASKET

Load dimension:	500 x 500 mm
max. top clearance:	60 mm
max. down clearance:	20 mm
Adjustable conveyor height:	1050 mm

### Connections/Consumption

Type of power system	5-Wire-System
Voltage supply (other voltages upon request)	3 x 400 VAC ± 5 % 50 Hz
Connected load	16,5 KW
Typical operating capacity for Galden HS 240	5,5 KW
Typical operating capacity for vacuum and Galden HS 240	7 KW
Compressed air connection	M 16 x 1 mm (12 mm Cu-tube)
Operating pressure	5- 6 bar
Cooling water connection	M 24x1,5 mm (18 mm Cu-tube)
Operating pressure cooling water	min. 2 bar – max. 5 bar
Cooling water flow	min. 10 –15 l/min
Differential pressure	min. 0,5 bar
Supply temperature	min. 10 °C – max. 15 °C

# Further machines of the Condensox Series

For each requirement the right system



1. Loading
2. Soldering/Vacuum
3. Cooling
4. Unloading



1. Loading
2. Soldering/Vacuum
3. Cooling
4. Unloading



1. Loading
2. Soldering/Vacuum
3. Cooling
4. Unloading



1. Loading
2. Pre-chamber/Pre-inertisation
3. Soldering/Vacuum
4. Cooling
5. Unloading

- > Smallest  $\Delta T$
- > Extremely efficient and uniform heat transfer over the complete assembly
- > Maximal soldering temperature limited from the boiling temperature of the Galden®
- > Patented injection principle warrants repeatable solder results
- > Optimal profiling
- > Control of gradients



**THERMAL SYSTEMS**



## Rehm Worldwide

As a leading manufacturer of innovative thermal system solutions we have customers on every continent. With our own locations in Europe, America and Asia as well as 26 agencies in 24 countries we are able to serve the international markets quickly and to offer outstanding on-site service – worldwide and round the clock!

- Location
- Production facility
- Representation



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