

# Ultrasonic Soldering Systems

soft soldering without flux



## Characteristics

- ✓ Soldering on glass, ceramic, aluminum, metal oxides etc.
- ✓ Flux free
- ✓ Corrosion free

## Application Fields

In production, research and development laboratories

- Surface Technology
- Thin-film substrates (vapor-deposited < 1 µm)
- Sensors
- Flat glass production
- Optical glasses
- Solar-cell production / maintenance
- Semiconductors
- LCD contacting
- Magnets / sintered material
- Superconductors (i.e. Niob)
- Ceramic Thick-film substrates
- Glass fibres

## Principle

With this new process, having an ultrasonic activated soldering tip, the addition of aggressive acid / fluxes is no longer required. The 'Ultrasonic Cavitation Phenomenon' cleans and removes the oxides on the surface of the substrate within the molten solder while soldering.

For flux free soft-soldering, MBR presents a special Ultrasonic Soldering System which allows soft soldering on **'hard-to-solder' and exotic substrates like glass, ceramic, aluminum, steel, titanium, silicon, metal oxides, super-conductors under normal atmosphere.**

**With this technology, glasses can be soldered on steel: gastight. - silicone components (i.e. sensors) can be soldered on ceramic targets.** These are two examples of possible applications only.

The high-energy ultrasonic vibration within the liquid solder breaks up the oxide layer on the surface of the substrate which has to be soldered.

An immediate wetting of the cleaned surface is the result.

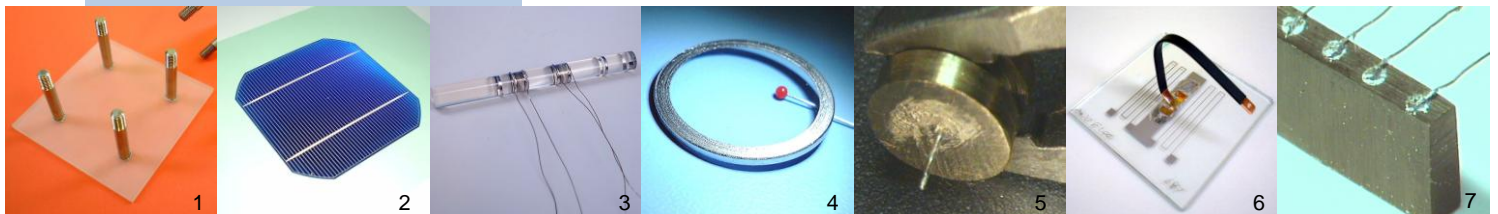
With high pressure, the liquid solder is forced efficiently into the tiny crevices, cracks and micro-pores of the substrate and thereby seal them and provide a greatly increased surface of solder for bonding purposes.

The ultrasonic vibration presses out gas bubbles of the liquid solder and produces a **shrink hole free joint.**

The Ultrasonic Soldering Process is very interesting if electrical contacts must be soldered onto vapor-deposited thin film metalized layers. The flux free solder joint on the metalized layer produces **absolutely no corrosion to the very sensitive vapor-deposited metal layer.**

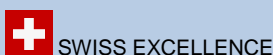
This process generates a solid bonding of the component and the substrate. Therefore, in most cases ultrasonic soldering is superior to the adhesive bonding:

- gastight
- extreme thermal-coupling
- heat-proof up to 250°C.



## Application examples:

- 1 \_\_\_ Mechanical joining of titanium rods on sapphire plate
- 2 \_\_\_ Contacting of solar cells: Si-Wafer, Thin-film-cells, Dey sensitised cell
- 3 \_\_\_ Contacting of Niob coil to a Zerodur rod
- 4 \_\_\_ Tin-coating/metalizing of optical glasses
- 5 \_\_\_ Vacuum-tight soldering of glass fibre 120 µm into bronze head with bore of 0.5mm
- 6 \_\_\_ Electrical contacting of copper wire on a aluminum track on glass-substrate
- 7 \_\_\_ Contacts on a ceramic carbon hybrid superconductor. Ø of the soldering points: 0.8mm



## USS-9200



- For small area applications
- Manual operation
- 12W / 60kHz ultrasonic power
- Ultrasonic-frequency: 59kHz  $\pm$ 3 kHz
- Soldering tips  $\varnothing$  1 – 5 mm
- Key-lock function to 'freeze' settings
- Temperature range: 150°C – 480°C

## USS-9500



- For big area applications
- Manual operation
- 25W / 40kHz ultrasonic power
- Ultrasonic-frequency: 40kHz  $\pm$ 3 kHz
- Soldering tips  $\varnothing$  6, 8, 10 mm
- Key-lock function to 'freeze' settings
- Temperature range: 150°C – 480°C

## USS-1906



- For small AND big area applications
- For built-in robot equipment
- Powerful for continuous operation
- Data interface for controlling of soldering parameters and operation from the computer
- 12W + 25W ultrasonic power
- Plug for hand tools and robot soldering heads
- Available as rack housing 3HE/42TE or as desk station



The adhesion force is depending on not only the ultrasonic vibration but also on the composition of the solder alloy. The active solder alloy CERASOLZER is available in different alloys and melting points.

## Solderable Substrates

- Aluminum
- Ceramics
- Electro conductive ITO coated glass
- Silicon
- Titanium
- Semiconductors (i.e. germanium)
- Lead glass, soda glass etc.
- Magnets sintered metals
- Chromium, Copper, Tin
- Zinc
- Superconductor (i.e. Niob)
- Ceramic thin- and thick-film substrates

The complete list is available at [www.cerasolzer.com](http://www.cerasolzer.com)

## Technical Specification

Description	$\varnothing$ wire	melting temps
CS186	1,6 mm	186°C
CS224	1,6 mm	224°C
CS246	1,6 mm	246°C
CS297	1,6 mm	297°C
<b>RoHS-conform</b>		
GS200ALU	1,6 mm	200°C
GS155	1,0 mm	155°C
GS182	1,0 mm	182°C
GS217	1,0 mm	217°C
GS220	1,6 mm	220°C