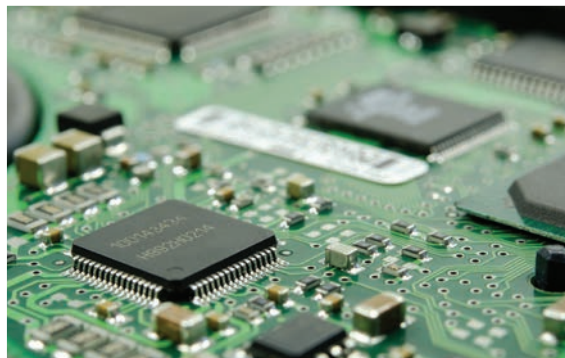


MEBW-60

MICRO ELECTRON BEAM WELDER



**HIGH PRECISION ELECTRON BEAM WELDING,
DRILLING AND SURFACE MODIFICATION**



MEBW-60 L8

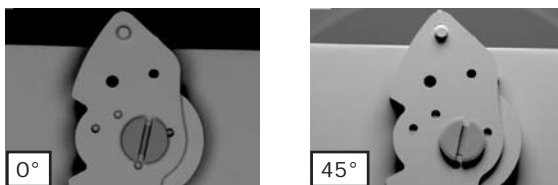
MEBW-60 L95

General Features	Accelerating voltage	between 5 to 60 kV continuously adjustable	
	Beam current	0.015 mA - 33 mA @ 60 kV, DC and fast pulse mode	
	Max. beam power	2 kW	
	Beam diameter	less than 50 μm @ 1 mA beam current. Down to 30 μm with lower current.	
	EB Deflection range	> +/- 8°	
	Chamber size	$\text{\O}235 \text{ mm} \times 200 \text{ mm}$	500x500x400 mm ³
	Workpiece Dimension	$\text{\O}100 \text{ mm} \times 150 \text{ mm}$	250x230x170 mm ³ (at full motion, larger on request)
workpiece manipulation	Accuracy rotation	< 0.1 °	< 0.1°
	Travel	250 mm (z only)	+/- 75mm (x/y), 250 mm (z only)
	Accuracy x/y/z	< 50 μm [z only]	< 50 μm
	Speed rotation	0.1 - 100 rpm	0.1-30 rpm [180°/s], other configurations available on request
	Speed x/y/z	0.1-100 mm/s (z only)	0.1-100 mm/s (x/y)

Note: All axes are fully CNC controlled.

Newly available: MEBW-60 L135, see separate brochure.

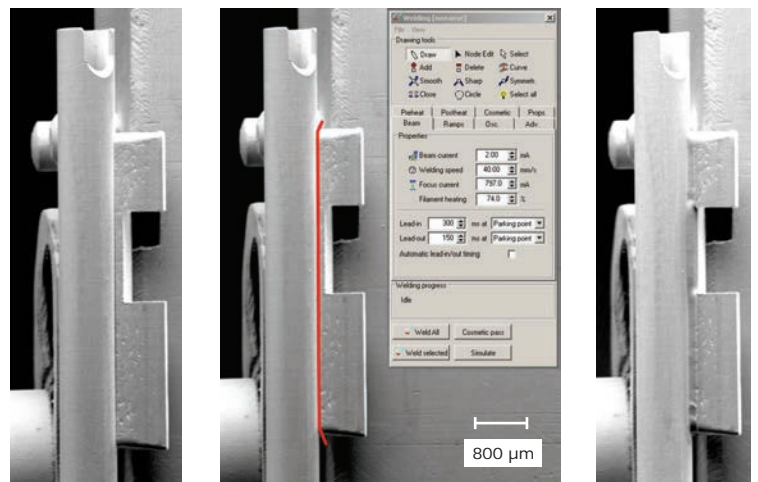
Scan & View



Scan & View (SEM mode)

Welding in the micro range requires an exact positioning of the electron beam. With the FOCUS MEBW-60 the work piece can be observed at any time in its totality and in microscopic range up to a resolution of about 25 μm by means of a scanning electron beam (SEM-mode). To generate the picture two alternative electron detectors can be selected. During the welding of dissimilar metals an enhanced material contrast is needed (0° detector). In order to enhance the topographic contrast the 45° detector can be used. After the process, the results can be examined with this technique.

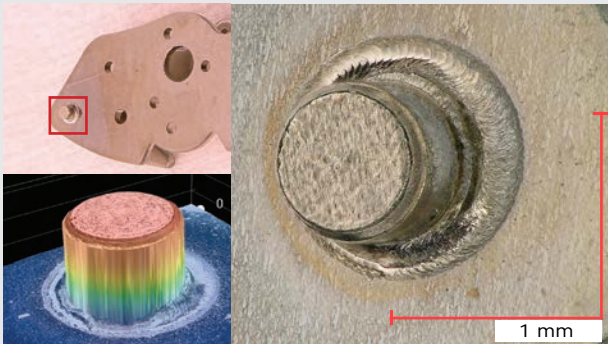
Software Package



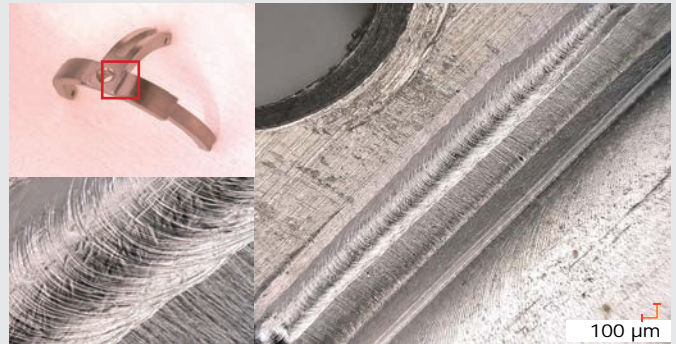
The included software package allows for programming of complex welding tasks with a CNC control unit, or for delicate parts like in the figure, with a 'teach-in-programming', which allows the drawing of a designated welding trace into the SEM-Picture of the work piece. To simplify the programming of common weld tasks even more, like radial welds, a very user friendly programming software is installed, including spot welding to avoid distortion caused by welding.

APPLICATIONS

Micro Joining

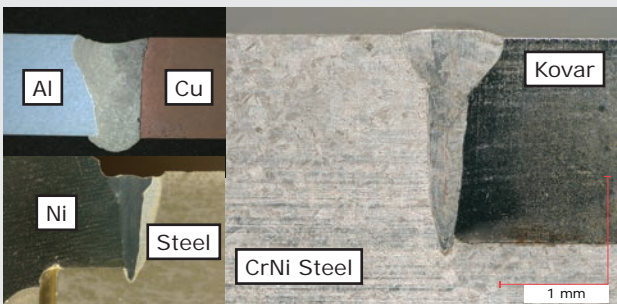


Part of a mechanical wrist watch consisting of NiCu. The bolt has a diameter of 800 μm and the weld width is less than 200 μm .



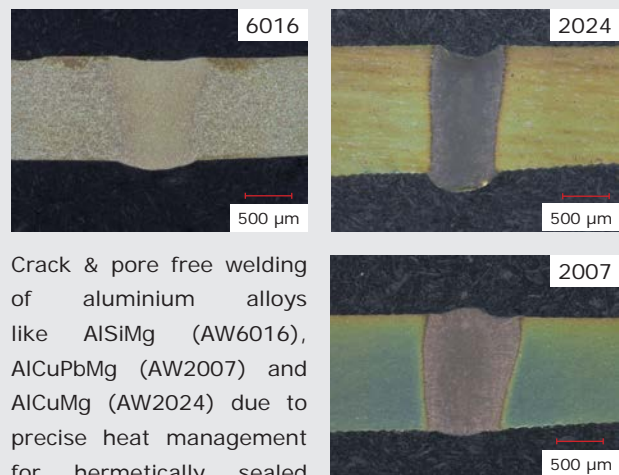
Part of an electron microscope consisting of titanium. The weld width is about 150 μm and is free of any defect.

Dissimilar Welding



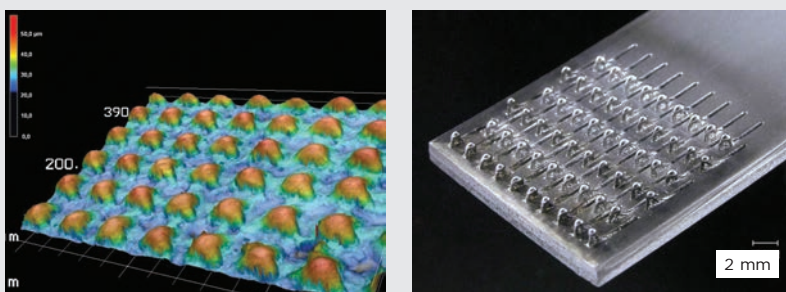
Defect free welding of material combinations like aluminum to copper, nickel base alloy to carbon steel (turbo charger), stainless steel to kovar and many more: Due to the very fine beam and the ability of an ultra precise positioning the composition of the melt and the growth of intermetallic phases can be controlled.

EBW of aluminium alloys



Crack & pore free welding of aluminium alloys like AlSiMg (AW6016), AlCuPbMg (AW2007) and AlCuMg (AW2024) due to precise heat management for hermetically sealed sensor & battery housings.

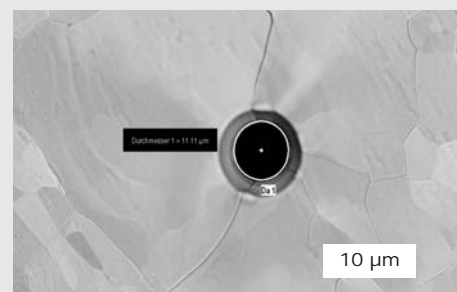
Surface Modifications



Surface Modification in the micro range by fast beam deflection can increase the joining properties of adhesive bonds and polymer-steel joints, hardness of a surface or can be used for engraving. One possible method is Surf-i Sculpt[®] which was used in the examples above.

Surf-i-Sculpt[®] is a registered & patented trademark of TWI.

Micro Drilling



EB-Drilling with a fine focus beam on a 100 μm molybdenum metal sheet. Drilling of very smooth and precise holes with diameter less than 10 μm can be achieved.

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Process Development:

We offer a complete advisory service for the electron beam processes like welding, brazing, drilling and surface modification.

This includes the guidance during the construction phase, the machining of test pieces, the parameter study and the assesment of the welds according to DIN ISO 13919.

Additionally we provide He-leakage testing, quantitative 3D surface- and metallurgical analysis. The mechano-technological properties can be tested via hardness measurement and tensile tests.

Machine Development or Jobshop:

Beyond the two standard machines, we offer customized machine conception to the special requirements of your parts. Single-part or small-scale production is possible at all facilities including the process development.

After-Sales Support and Training:

Our support does not finish with the sale. We offer to our customers a full service over the whole life time of the machines. This includes in detail:

- Training of your operator
- Process Development for new applications
- Software update
- Spare part management
- Development of special instruments like e.g. wire feeder or temperature control unit adopted to your needs.

Our highly skilled engineers are looking forward to get in contact with you.

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