

Electron beam welding machine

# POWERBEAM Series



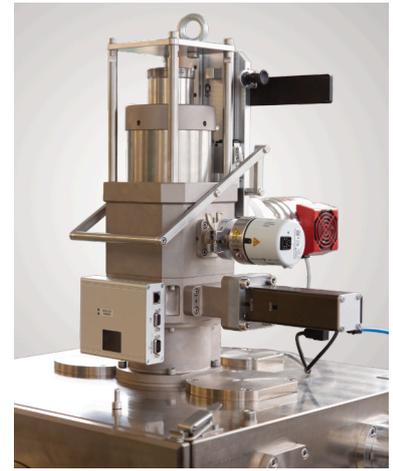
- Continuously adjustable beam power
- Fast beam deflection
- Precise micro welding
- Built-In SEM for quality control
- Welds a wide range of materials

## PRODUCTS

The heart of the electron beam welding machine is the MICROBEAM: a unique 2 kW electron beam generator with precise beam control. The high precision control of beam size, position and power allows to address a very narrow process window, using a spot size which can be adjusted between 25  $\mu\text{m}$  and beyond 1 mm.

- A triode electron gun for particularly precise beam control. Equipped with a direct heated tungsten hair pin, ribbon-type or  $\text{LaB}_6$  cathode to form an axisymmetric electron beam with a small crossover
- High voltage power supply delivering a continuously adjustable beam voltage from 5 to 60 kV (Minimum step size is 20 V) and beam current from 15  $\mu\text{A}$  to 33 mA (Minimum step size 10  $\mu\text{A}$ ). In combination with the pulse mode, most demanding process windows are addressed

FOCUS offers standard micro electron beam welding machines for various tasks. All machines are equipped with the MICROBEAM generator which is also available as a component package to upgrade existing EB systems.



### POWERBEAM L8

Best performance for axial & radial electron beam welding. Compact working chamber and turning chuck mounted on a CNC driven z-axis.

- 8-litre-working chamber (cylindrical):  $\varnothing$  235 mm, depth 155 mm
- The outer work piece diameter can range from approx.  $\varnothing$  3 mm up to  $\varnothing$  135 mm
- Compact footprint 2 x 2,5 m, adjustable



### POWERBEAM L95

Compact electron beam welding machine with X/Y CNC table, rotation and larger working chamber.

- 95-litre-working chamber: 500 x 500 x 400 mm<sup>3</sup>
- x/y workpiece manipulator with  $\pm$  75 mm travel
- Compact footprint 2 x 2,9 m, adjustable



### POWERBEAM L135

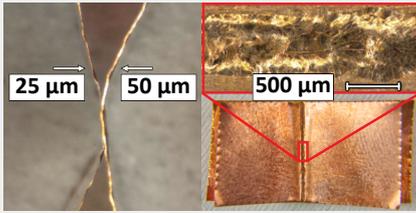
Universal machine for a wide range of electron beam welding tasks with an enlarged chamber and movable electron-beam generator.

- 135-litre-working chamber: 500 x 500 x 540 mm<sup>3</sup>
- x/y workpiece manipulator with  $\pm$  75 mm travel, with single or drum rotary devices (vertical or side mounting)
- CNC linear electron gun shift with 160 mm travel
- Footprint 2,3 x 3,9 m, adjustable



Standard welding machines provide the ability to solve most tasks. We also develop customized configurations of electron beam welding machines for unique requirements.

# APPLICATIONS

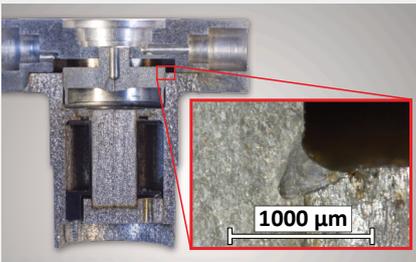
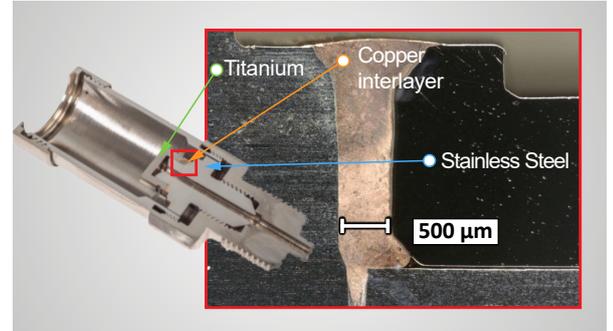


## Precision Engineering

- Joining within very small process window: thin copper foils of 25 µm and 50 µm thickness
- Feasibility studies for battery research and production
- Components for electromobility

## Sensor Housing

- High welding precision in terms of beam focus and beam power is a prerequisite for fine manufacturing of sensors, where small variations in welding have a significant impact on the final product's performance
- Vacuum welding allows to provide vacuum-tight seams and does not require further pumping of the sensor
- Welding a wide range of similar and dissimilar materials including copper, aluminium, titanium, stainless steel, tantalum, zirconium, niobium, molybdenum, tungsten etc.



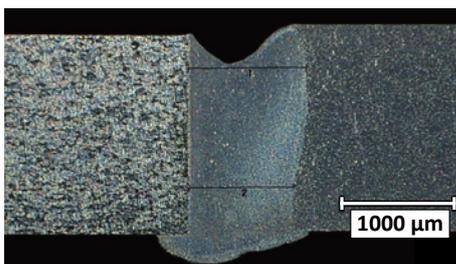
## Aerospace Industry

- The aerospace industry is using precise electron beam welding for the production of aviation components, spacecraft (such as rockets and satellites), and defence systems
- strong, reliable, vacuum-tight connection of light-alloy metals
- various sensors, accelerometers, turbine blades, fuel injectors

Our POWERBEAM machines are equipped with advanced features that enable our customers to produce high-quality welds with minimal heat input and distortion. FOCUS can weld a wide range of materials, including metals, alloys, semiconductors, dissimilar materials with various thicknesses and complex geometries.

## Nuclear Industry

- Electron beam welding is a preferred and verified technology for nuclear industry applications due to its ability to produce high-quality and precise welds
- Welding of fuel rods to end caps to create nuclear fuel assemblies
- Manufacturing of various reactor components, such as pressure vessels, steam generators, and heat exchangers



## R&D

- Open system architecture for innovative ideas
- Compact size, laboratory & clean room compatible
- SEM-mode, inspection glass or optical CCD camera for observation of all processes
- Possibility to easily add measurement instruments
- Very flexible in terms of parameter range and workpiece size
- Generation of almost arbitrary heat fields, heat gradients on a sample or local modifications of the surface

## EXTRAS

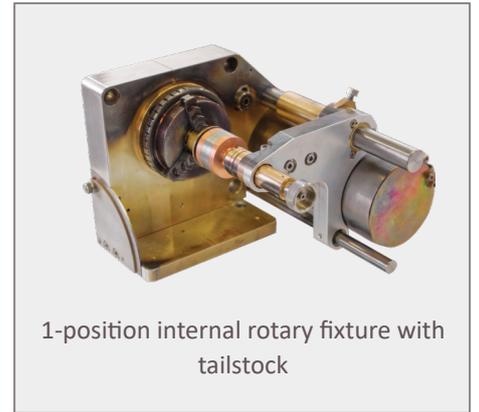
Different solutions for workpiece fixtures and heat dissipation are key to achieve excellent results for precision electron beam welding. We offer both standard solutions and the development of unique holders based on customer requirements.



1-position rotary fixture with a 3-jaw chuck



Tailstock for 1-position rotary fixture



1-position internal rotary fixture with tailstock



6-position rotary fixture with 3-jaw chucks



Multi-tailstock for 6-position rotary fixture



X/Y table

## WHAT'S MORE?

In addition to traditional electron-beam welding tasks, FOCUS also offers solutions for surface modification. The precise energy transfer allows for very fine control of the melting process of wires or powder.



Wirefeeder



L135 with customized wirefeeders

For more information please visit [www.focus-welding.com](http://www.focus-welding.com) or contact us!

SPECS Surface Nano Analysis GmbH BU FOCUS, D-65510 Huenstetten, Germany  
Tel.: +49(0)6126-4014-0, E-Mail: [focus-sales@specs.com](mailto:focus-sales@specs.com)