

Materion Electrofusion Electron Beam Welding Service

Materion Electrofusion offers an extensive list of on-demand shop services and CNC electron-beam (EB) welding is at the top of our list. Since EB welding leaves only a tiny heat affected zone, there is almost no distortion to the surrounding material. Also, since many materials can be EB welded with no filler material, there is no concern about the interaction of filler material with the rest of the final product. EB welding is ideally suited for most scientific and industrial applications, including beryllium x-ray windows, ultrahigh vacuum products, semiconductor equipment, aerospace and other industrial fabrication. Complete in-house design, fabrication, and testing capabilities are available to support you.

Our CNC EB welding services offer the following features and benefits:

- Contaminant-free processing
- Low heat and distortion
- High structural integrity
- Superior control and versatility
- Welding dissimilar metals
- Up to 2.0 inch (50mm) single-pass penetration
- Delicate welds down to 0.002 inch penetration
- Excellent substitute for TIG welding

In order to prevent weld component contamination and oxidation, which is especially important when welding reactive metals, EB welding is performed in a vacuum environment.

We specialize in the welding of many types of materials, including those labeled as exotic or difficult by most other service providers—aluminum, beryllium, columbium (niobium), magnesium, molybdenum, rhenium, tantalum, titanium, and tungsten are just some of the materials that can be welded at our facility. Backfilling with inert gas to speed cooling and prevent oxidation is also available in our processing. We consistently produce welds that pass stringent acceptance criteria and can be certified to customer needs and specifications.

Materion Electrofusion performs helium mass spectrometer vacuum and hydrostatic pressure testing to verify hermetic seal. Post-weld non-destructive testing service is also available.



Our facility is equipped with two EB welding systems running at different power levels, thus accommodating a wide range of welding projects. Chamber sizes are 14" x14" x14" and 36" x36" x52", and both can take extensions to increase their capacity, so please contact us if you have questions as to whether or not your part will fit inside our welding systems. Electron guns are adjustable to variable focus heights with a fine beam concentration of 0.006 inch (0.152mm) diameter. Our larger welding system is fitted with an in-vacuum CNC programmable X-Y welding table, which is connected to our CAM system, permitting the downloading of files directly to the equipment. Our smaller welding system has very fast pump down times, making it ideal for large quantities of small parts.

Quick turnaround EB welding services are offered for small part quantities and for larger quantities or on-going orders, we can schedule specific welding times or batch sizes to fit your needs. For more information, please contact Materion Electrofusion to discuss your specific product and lead-time requirements.

Health & Safety Note:

Handling solid beryllium material poses no significant health risks. However, as with many other industrial materials—materials containing beryllium may pose a health risk, if and when recommended safe handling practices are not followed and adhered to. Inhalation of airborne beryllium may cause a serious lung disorder in susceptible individuals. The Occupational Safety and Health Administration (OSHA) have set mandatory limits on occupational respiratory exposures. Read and follow the guidance set forth in the Material Safety Data Sheet (MSDS) before working with beryllium. For additional information on safe handling practices or technical data on beryllium, contact Materion Electrofusion.

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