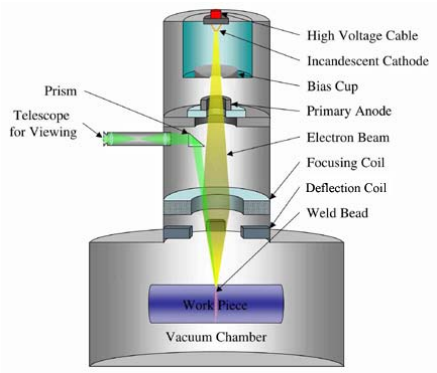
ELECTRON BEAM WELDING

Electron beam welding (EBW) is a fusion welding process in which a beam of high-velocity electrons is applied to the materials being joined. The workpieces melt as the kinetic energy of the electrons is transformed into heat upon impact.



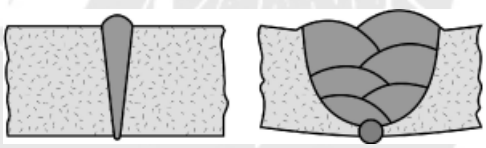
Application

Electron beam welding (EBW) is used mainly for fabricating structures that have stringent quality, strength, and joint reliability requirements. For more than 45 years this process has been applied in aerospace, shipbuilding, and instrument manufacturing.

Why Choose EBW?

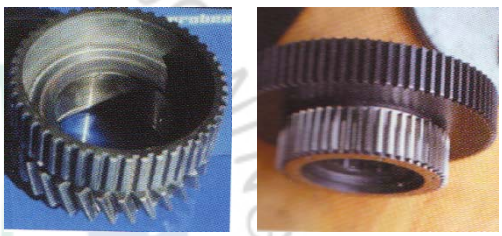
Compared with arc welding processes, EBW improves joint strength 15 percent to 25 percent. It has a narrow heat-affected zone (HAZ), which results in lighter-weight products. Geometric shapes and dimensions are highly stable, particularly when it is used as a finish operation. It eliminates oxide and tungsten inclusions and removes impurities. The weld metal has a fine crystalline structure.

EBW also is suitable for a variety of difficult applications, such as welding structures on which the reverse side of the butt is inaccessible; gravity welding of thin metal; and welding in various spatial positions



Comparison of EBW with conventional welding

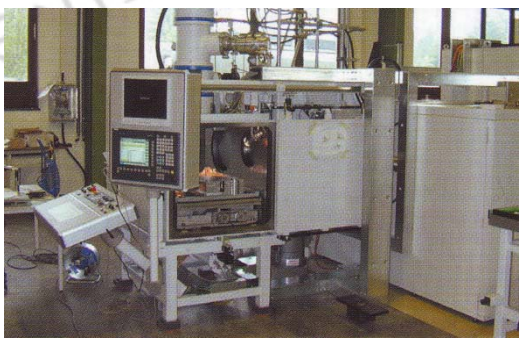
Provides a low level of overall heating of the structures; and has the ability to vacumize the inner volume simultaneously, which is suitable for sealing instruments. Because EBW is an automated process, the welded joint quality is consistent. The process does not require shielding gases, tungsten electrodes, or edge preparation for welding thick metal. Finally, it can be used to weld some joints that cannot be made by other welding processes.



Gear combinations with difficult access to weld positions

EBW Limitations

- High equipment cost
- Work chamber size constraints
- Time delay when welding in vacuum
- High weld preparation costs
- X-rays produced during welding
- Rapid solidification rates can cause cracking in some materials



Machinery of EBW

Apart from the expensiveness of the equipment that is necessary as well as the professional personnel, Electron beam welding responds with high quality results. And can be used with all kind of steel, aluminium, magnesium, copper, nickel, Cobalt alloys as well as with dissimilar materials.