

Laser Welding in the Jewellery Industry

The UK Jewellery Industry Discovers Lasers

Rofin-Baasel has been supplying the StarWeld Performance laser welders to the jewellery manufacturing industry for 14 years. Some of the most important jewellery applications for the StarWeld include the ability to repair/fix voids created during the casting process, thereby retaining the full value of the product. Normally, pieces with these voids are either scrapped, or, if repaired using conventional methods there may be telltale marks noticeable to the trained eye. This equates to a loss in their value. Typically such pieces are intricate gold or platinum that begin from a basic casting (e.g., platinum ring) to which further decorative work is added and, finally, stones. Only when the piece is fully assembled is it sent for polishing, during which process defects in the casting may show up.



Parts to be welded are held in position by hand – the most flexible and versatile welding results are possible

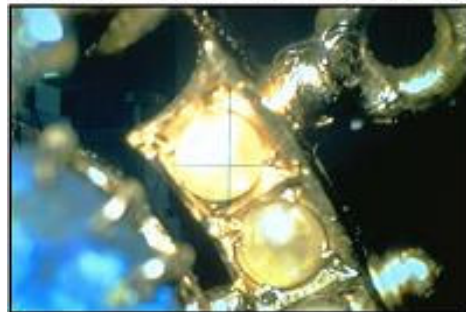
Repair Cracks and Voids Invisibly

The challenge now is to repair these voids and cracks invisibly, if possible. Using conventional brazing methods, the stones would need to be removed, and an alloy of the host (ring) material with a lower melting point used to fill the defects. This has a number of disadvantages:

- Labour cost to remove/fit the stones
- The alloy filler used is softer than the host material and still tends to polish away during repolishing, resulting in shallow indentations which lower the value of the piece
- The alloy material may have a different colour to the host.

Laser welding offers the following advantages when making these repairs:

- Because of localized heating, there is now no need to remove precious stones (even welding in the close proximity of rubies, which are most sensitive to heat, is possible with careful use of the laser).
- Because of the intense concentrated heat of the laser, the same filler material as the host can be used, resulting in repairs that are



Intricate gold work on ring ready for spot welding. Below is a view of the ring under the StarWeld Microwelder microscope showing a spot weld and the guide crosshair

practically invisible, thereby retaining full value of the piece.

Spot Welding in the Assembly Process

Another application for which the system is also being used is spot welding earring shells prior to sending them through the reflow oven. Traditionally, the two halves (shells) which have solder paste placed between them are held together with stainless steel binding wire, a time consuming task to fit and one which adds additional cost. Placing a few spot welds around the perimeter of the piece holds it together and speeds up the assembly process. The variable focus adjustment feature is absolutely essential for jewellery applications. The small spot size is used for joining parts to the piece to be worked, while the larger spot size gives a smoother finish when used to fill imperfections in the casting. In fact, the idea for the variable focus came from Rofin-Baasel's jewellery representative in Germany!

Rofin-Baasel (UK) Ltd.

Rofin-Baasel (UK) specializes in laser welding, marking and micro-machining systems for a diverse range of industrial applications, and many of the laser systems are manufactured at the parent company in Starnberg, Germany. We are one of the world's leading companies in the field of laser-based material processing. The company has approximately 9000 systems in operation world-wide

Rofin-Baasel (UK) occupies a well-equipped facility in Daventry, Northants for its sales, marketing, engineering, manufacturing, customer service, spare parts, and administrative operations. This facility also has a complete applications lab in which a wide range of laser systems can be demonstrated in operation and customer samples processed.



The StarWeld Performance Laser Microwelder specifically designed for spot or seam welding of different metals or metal combinations

