Case Study

Laser Welding in the jewellery sector

Baasel Lasertech developed the first manual, pulsed Nd:YAG laser, eye safe spot welder aimed at the jewellery market, back in 1992. Today, Rofin-Baasel is a market leader in the jewellery sector and has over 4,000 lasers installed in it. One of the reasons they claim for this success is their principle of continuous improvement; extensive customer feedback is valued and implemented into subsequent generations of laser workstations.

The earliest adopters of manual laser welding (as opposed to automated laser chain welding, for example) were generally jewellery designers and manufacturers. Today, however, the biggest growth is in the retail sector – high street jewellers with repair workshops are recognising that despite the substantial outlay, the laser is an indispensable tool for jewellery repair. Indeed, operating a laser may become a prerequisite to survival in the repair business.

The manual nature of the laser welder allows the skill and innovation of the jeweller to be enhanced with a tool at the leading edge of technology. The components are held in the hands underneath the laser beam, with the precise location of the laser weld accurately viewed through a stereo microscope.

Manual laser welding allows platinum, gold, silver, stainless steel and titanium (and other metals and alloys) to be joined together without resorting to soldering. A laser weld is strong and pure even in areas where it would be hard to gain access through any other joining technique, more often than not if you can see the joint – you can weld it.

David Shone owns Emson Haig – which has successful retail outlets in the Lakeside Shopping Centre and Loughton in Essex.

Laser welding – the user holds the item within the chamber and views through a stereo microscope

Rofin-Baasel StarWeld being demonstrated at a jewellery workshop

Last year David added to the capabilities of his workshop by investing in a state-of-the-art laser welder, the StarWeld Performance from Rofin-Baasel in Daventry. “I purchased one at the Spring Fair, and it’s the best thing I have acquired for my shop in five years," said David. "If you have any skill on the bench, you must have a laser welding unit.”

The laser makes repair of damaged claws, prongs or shanks easy. The controlled, localised nature of the heat input means that repairs can be effected without the need to first remove sensitive gemstones or enamel. Chain repair takes a fraction of the time of conventional methods and the results are stronger. Resizing of platinum or gold rings by welding with filler wire (of the same material as the casting) allows perfect results to be achieved more quickly than by traditional methods. The laser is also finding diverse uses such as restoration of antiques, repair of watches and repair of titanium spectacle frames.

As David Shone says: “It revolutionised my workshop. I can repair gold or steel watch cases and put metal back into them. We also use it to repair platinum rings, which have had porosity problems.”

Using the laser is quick and easy to learn – and where platinum is concerned, excellent results are achieved with low power and no oxidisation – so there is normally no finishing required. Adjusting the spot size and laser parameters is easy using joysticks inside the welder. The workpiece is viewed using a stereo microscope and the position of the laser weld is precisely set using a fine cross hair. Laser firing is under the control of a remote foot switch, keeping the hands free to position the parts in the weld area. After a short training course, an inexperienced operator can achieve excellent results.

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