

You no Longer Need to Say: This Can't be Done

Laser Welding Applications in Jewelry Manufacture

By Jurgen J. Maerz • PLATINUM GUILD INTERNATIONAL USA

Often times in the past, platinum castings were recycled because of porosity or other small defects, diamonds in semi mounts were sometimes burned during welding, and sizing seams on platinum rings were visible with the untrained eye.

Well, this was before laser welding stations became available to the jewelry industry. Today, most any job that requires welding can be done thanks to this great tool. Be it a re-tipping job, a weld near a stone, the installation of a spring without losing its tension, or the building up of a thin spot or the filling of a porous casting. Even chain production is today being done with automatic linking machines, using lasers to weld the little links that make up the chain. No solder, no reduction of purity, no mess, just cleanly welded links.

For many years, soldering has been the standard method to join precious metal pieces together in jewelry production, fabrication and repair. Although adequate for most applications, solder often resulted in inaccurate assembly, distortion, and weakness caused by porosity in the solder joint. Oxidation and discoloration had also been a problem. With a laser welder, many of these obstacles have been over come.

Many casting houses have reduced the number of casting rejects and thus improved productivity by using a laser. If there is porosity in a casting, or minor defects that appear during the finishing process, often times these pieces needed to be

recycled. This is not only costly, but also time consuming. Using a laser, porosity can be filled invisible in a very short time.

Laser welded seams are stronger than a traditional solder joint. Laser-welded connections are 260% stronger than solder, 43% stronger than micro-plasma welds, and almost as strong as the original alloy.

There are currently over 1000 laser welders in operation in North America. While they are not all in the jewelry industry, it is not surprising that the dental industry has become interested in these machines as well. Crown and bridges can be assembled in a much more convenient manner. For an Optician, the laser is a great tool to repair broken eyeglass frames in seconds. Medical components and electronic component parts are also being assembled with laser welders.

Laser welders can be used to weld most any metal including platinum, gold, silver, titanium etc. Because of the low heat conductivity, a laser is the ideally suited to work on platinum. One could almost think it was invented just for it. It is possible to do the most difficult welding while holding the platinum piece in the hand.

Something that cannot be done with a torch.

Semi-mounts have traditionally presented a problem. As the head for the center stone needed to be soldered in place, often times the side stones in that mounting would be burned. Short of using a lower temperature gold solder, the job could almost not be done right. Today, using a laser, this operation is performed without fear of burning the stones.

Many of the fine delicate designer pieces are assembled with lasers. There were several pieces during a

recent design competition, made exclusively with lasers. In fact the design could not be executed with conventional soldering methods.

Most laser welders are Nd:YAG pulse laser systems 30-80watt/class 1, ranging in power from 50 to 120 joules. This makes them ideal for a wide variety of industrial applications. The units are compact and safe to work with. There are many safety features that protect the operator. One such feature is the fact that both hands have to be inside of the machine to fire the laser. The viewer, which in many cases is a binocular microscope, has build in protection feature which makes it impossible to be blinded by the laser. The operator looks at the welding area through a cross hair aiming device, which exactly pin-points the location where the beam hits. Some laser welders use video viewing, where the image the operator sees is actually a video screen and thus quite safe.

Within the chamber, there is a valve that makes it possible to inject cooling compressed air into the chamber. It is also possible to use a cover gas, such as Argon to prevent oxidation during welding.

Laser welders are quite portable and can be easily moved to any location in a plant. In recent times these laser work station are even available as a quite small, compact desktop model

Laser application for automated chain fabrication as well as engraving purposes are appearing on the scene.

Because of the low learning curve, it is possible to train a laser operator in just a few days. With steady practice, one can be an expert at repairs and assembly techniques within six month to a year.

There is a great future for these

machines in our industry and the fact that they are very applicable for platinum fabrication, repair and construction is an extra benefit. Using a laser, most any job is possible and one no longer need to say: this can't be done.

