

Ring Sizing

There are several techniques for sizing with a laser. Cutting a shallow 'v' notch in the ring shank, then filling with laser wire is common with thicker shanks. Once you cut the ring to desired size, weld around the outside of the joint with a narrow beam. Next, use a file to cut a shallow 'v' notch on the inside. Weld into the v notch and then raising the beam diameter; fill the notch with your laser wire. Most sizing can be achieved with a flush/butt joint. Cut the ring to the desired size keeping the joint as flat and snug as possible. Raising your milliseconds and with a narrow focus, you should hear a slight slapping sound on the metal as you weld the seam. After the initial weld, raise the focus above .43mm (10 focus) to add laser wire and smooth. Your laser beam should be at a 90-degree angle into the seam, trying to achieve a 50% weld depth from each side of the shank. Working left to right rather than up and down while sizing will improve your speed. Also, hold the ring in your left hand with a slight angle to the right. Hold the laser wire in your right hand and this technique will save time and be more efficient.

Porosity and Pitting

Filling porosity has very similar settings to ring sizing. The parameter settings should produce a slapping sound on the metal with little or no splashing of the metal. Start in the middle of the porosity field and work in an overlapping spiral pattern outward. You will know when you get to the edge of the porosity when the metal does not mark as easy or the beam stops splashing. Most often the settings should have milliseconds set around 4.0 and beam diameter of .35mm (8 focus) or higher. Any pitting that may occur while adding wire can be quickly fixed. Drop your focus to half of what was being used and shoot straight into the hole. This should heat up the surrounding metal and eliminate the pit. Increase the focus back to original setting and add more wire as needed.

Chains

Adjust parameters to metal type, lower milliseconds below 3.0, and raise the focus to .55mm (15 focus) or higher. This will work for most standard size links and/or jump rings. You may need to decrease the voltage for fine or thin box chains. For filigree and hollow chain, you may want to use a 50% pulse shape. What pulse shaping does is limit the power of the laser beam even below what the lowest voltage setting could achieve. To do this, you first have to go hit the F1 key. This will bring up the Pulse Shaping menu. Now select either pulse shape 4, 5, or 6 which are the User programmable ones. The display shows an X and Y axis where the X axis is the Pulse Width (or time in milliseconds) and the Y axis is the Voltage. You will want to set all the Y axis positions to be at 50%. After this has been done, go back to the main screen (hit F1 again) and select the pulse shape number you just programmed (4,5 or 6). The voltage you will use to get the results you need may seem higher, but remember, it will actually be only 50% of the power (240 volts will reflect 120 volts on this type of setting). Always change back to full pulse (pulse shape 0) after welding.

Rebuilding Channels

To rebuild worn down or damaged channels, use 28ga or 30ga wire of the same metal type. Use the same settings for smoothing, focus .43mm to .55mm (10-14 focus). Rotate the stones away from you, then add the wire at a slight angle. Begin firing at the thicker side of the channel and make a bead over the area. Continue building up material until there is enough to push over or add material directly over stone. The wire itself can be used as a shield to protect the stones in some cases, otherwise use toothpaste or angle the ring so any reflections go away from the stone. Remember to work slower around heat sensitive stones, thermal transfer could damage these types of stones.

Re-tipping Prongs

The focus always depends on the mass and width of the prong. (How wide or narrow, thick or thin) Using your 28ga or 30ga wire, walk the tip into the path of the laser slowly. Your wire will bead up. (14k & 18k Palladium white, Platinum, and 22k yellow will bead nicely) Once the bead is the same thickness as the prong, use some pliers to flatten the bead. Rotate the stone away from you, place tip over stone and weld to the outside portion of prong. (Note: this type of tip requires some prep work over the tip, usually sanding or filing the portion over the stone completely off). If you are going to add wire straight to the prong, use 30-36ga wire. Start by adding the material on the thicker part of the prong. After you have some thickness, angle the ring and use the beam to start pushing the metal over the stone. Use toothpaste to help protect the stone.

Rebuilding Prongs

Use same settings for re-tipping, use round or square stock, same thickness as original prong. Sometimes you can pre-cut a seat in the new prong. Filing a slight dovetail joint helps as well. Place the new prong on the base, weld the joint keeping your milliseconds around 3.5-4.0 and your focus around .35mm to .43mm (8-10 focus). Add new wire if necessary. For rebuilding prongs using the balling method, set laser to standard parameters for adding wire. Feed your wire into the cross hairs slowly heating the tip to form a ball. You can weld this bead to the prong and then fold over the stone. Or, by using a pair of pliers, you can flatten the bead to get a more flush fit over the stone. If more material is needed, use a slow Hz to shoot one pulse at a time, and then add more wire starting away from the stone. A wrapping technique can be used to build out over the stone as well. Start with the wire on the outside of the prong close to the girdle, weld, and then start to wrap wire up and over the stone. Weld the wire to the previous bead or flattened wafer. Using a scheming affect works best.

Stone Setting

Tack weld peg heads in place with the laser; the head will stay in place while you adjust it to be straight. Solder the head once straight. (Laser welding peg heads in place can cause trouble if trying to replace setting). Platinum heads can be attached with the laser as well. Treat similar to a sizing, use a narrow beam to get deep enough into the weld to secure. Use wider focus to add material and smooth. Invisible settings can be reset and tightened with the laser. Using a beam width of 5 and voltage strong enough to scoop and move metal into the grooved stone. These parameters CAN damage a diamond, so use a shallow angle so as not to hit the stone.

Small Parts

Many small parts can be welded with the laser. Safety chains, figure eight safeties, low base heads, box catches, etc. Using the 50% pulse shape can be helpful on small items as well. If the item is too small to hold with fingers or tweezers, weld it to the tip of your wire, then to the piece you are working on. After which, you can cut it with the laser or small clippers. Use a wider beam to smooth the surface if needed.

Titanium Welding

Argon shield gas MUST be used with titanium. Purity should be 99.7% or higher. Flood the chamber for a few seconds before firing. The flow rate should be soft and slow, less than 10 psi. Once you start firing, the weld should look nice, crisp, and have a clean silver/gray color. If any discoloration is present (blue, white, or purple) the argon is flowing too fast or there is too much air present. Lower the fan speed of the laser if needed. Anodized coatings on eye-glass frames need to be removed with a rubber wheel as this type of coating will make the seam brittle if it is not removed.