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Laser welding can be preformed using several methods. Two of the most common are pulsed and continuous wave (CW). We're often asked when it's appropriate to use one over the other.

### **What is Laser Welding?**

Laser welding is the technique used to join two pieces of metal together by the use of light amplification by stimulated emission of radiation which is how the acronym LASER was developed. Lasers are used to generate a concentrated heat source allowing for narrow, deep welds and high welding rates.<sup>1</sup> At Litron we use ND:YAG lasers which have the capability to operate in both pulse mode and continuous wave (CW) mode.

### **What Is CW Welding?**

CW welding stands for continuous wavelength which means the laser emits a steady laser beam over a period of time.<sup>2</sup> A CW laser is best described by how the weld looks which is a constant straight line of welds. The laser is able to penetrate deeper in CW mode than pulsed welding because it is emitting light continuously.

### **What Is Pulsed Welding?**

Pulsed welding is when the laser is pumped with short bursts to generate short controlled laser pulses.<sup>2</sup> Generally speaking there are on and off periods to the pulsed laser beam. The bursts are precise and repeatable in energy and duration of the pulses. The pulsed welding process takes a millisecond to complete; in fact the laser can produce several pulses per second. Pulsed welding will create a ripple effect of welds, one after another. Picture a stack of nickels fanned out in a row and this is what pulse welding looks like.

### **When Would you use Pulsed Welding vs. CW Welding?**

Pulsed welding produces short pulses and for that reason there is a minimal amount of heat that is transferred onto the part being welded. Pulsed welding is ideal for products that require welding near electronics or other materials that cannot be exposed to extreme heat. The repeated pulsing allows cooling in-between each spot weld so the part will not get too hot. Pulsed welding also allows for more control of the weld and therefore is used on smaller more intricate pieces.

CW welding has the ability to fuse together a wider variety of dissimilar metals, for example welding copper to stainless steel, and can laser weld thicker metal pieces because of the ability to penetrate deeper into the metals. CW welding is more diverse than pulse welding. However with CW welding the laser beam is continuously running and emitting light so the small areas where the laser is concentrated can make the metal extremely hot. Only metal parts that are not sensitive to heat should be worked on in CW mode.

Wondering which method is best for your parts? Let Litron review your next project and help figure out the most appropriate welding method to meet your requirements.

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<sup>1</sup> Information sourced from [http://en.wikipedia.org/wiki/Laser\\_welding](http://en.wikipedia.org/wiki/Laser_welding)

<sup>2</sup> Information sourced from [http://en.wikipedia.org/wiki/Laser#Continuous\\_wave\\_operation](http://en.wikipedia.org/wiki/Laser#Continuous_wave_operation)