

## NEWSLETTER September 2013

### 9.3um CO<sub>2</sub> lasers

Many people familiar with the continuous wave (CW) CO<sub>2</sub> lasers used for cutting, welding and engraving, may not be aware of the other "varieties" of CO<sub>2</sub> lasers available. In general the optics used for CW 10.6um cutting lasers will not operate with these other types of CO<sub>2</sub> lasers. For example high power TEA CO<sub>2</sub> lasers will destroy most coated mirrors within seconds. Although both the CW and TEA lasers emit the same 10.6um wavelength radiation, the TEA output is pulsed.

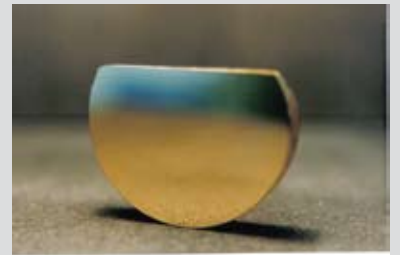
It's possible for CO<sub>2</sub> lasers to emit at different wavelengths, here the standard 10.6um wavelength optics are unlikely to work. Some are tunable over many discrete wavelengths in the 9 - 11um region, achieved by using a diffraction grating in the resonator. These tend to be low power, expensive research lasers.

Other lasers are available with "isotopic" CO<sub>2</sub> gas fills and are designed to lase at 9.3um wavelength. The 9.3um wavelength is far better absorbed by some plastics than 10.6um. PET - widely used to make clear plastic bottles - responds very well to 9.3um wavelength, as does Kapton which is used in printed circuit boards.

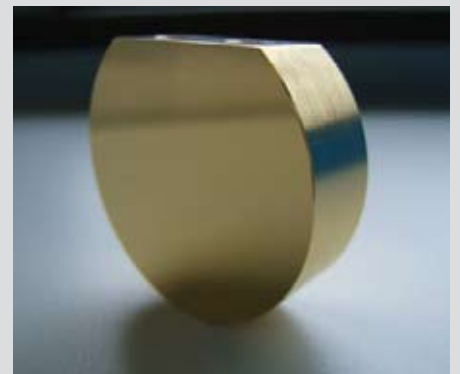
The good news is that our Gold coated Copper mirrors work reliably with all these types of lasers, no angles of incidence, pulse energy or wavelengths need be specified. Reflectivity of Gold at 9.3um wavelength = 98.4% (non-polarized).



### D-shaped mirrors



We occasionally get an enquiry for D-shaped (or 'pickoff') mirrors, which allow separation of closely aligned beams. D-shaped mirrors are ideal for picking off one of two closely spaced beams because our Gold reflective coating extends up to and even around the straight edge of the mirror. To avoid any extra diffraction a wedge of the substrate is removed from behind the straight edge of the mirror, akin to a chisel.



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## Watch out for the English weather!

The English weather, although often talked about, is rarely extreme. In Cambridge for example the dew point averages around 13°C for much of the year, but during July we saw it rise as high as 18°C.



In simple terms the dew point is the temperature at which water vapour in the air will condense into liquid. If that happens on a cooled laser lens or cooled laser mirror, then the water film will absorb the laser beam and boil off, destroying the coating on the mirror or lens. Condensed water films can also damage water cooled components in electrical equipment such as the power supply.

If you run a laser which is cooled by a recirculating water chiller, you'll probably have the operating temperature set to around 20°C. The water chiller operating temperature should be 2-3°C above the dew point, but remain within the laser manufacturer's limits. Synrad for example recommend a coolant set point of 18-22°C. This Summer though, a chiller temperature of 18°C would have been too low in the UK, and at times I'm sure below the dew point.

In other parts of the world I'm sure this is not news at all, but it has caught out at least one laser user in the UK that we know of.

## Emergency service

We recently had a call from a new customer in dire need of a replacement part for his small Chinese laser. The original coated glass mirror had cracked in two, mainly due to the poor mount design, giving two reflected beams.

The machine was being used to cut out intricate designs on edible rice paper cake decorations, and needed to be repaired quickly so the user could continue with his normal production schedule. We despatched a replacement mirror the same day, but due to unexpected flooding the courier failed to deliver. We immediately despatched another identical part which was gratefully received the next day.

Mark Wilkinson, Toppercake Managing Director (yes, and namesake of our own Mark Wilkinson) was extremely happy with both the fast service and the quality of the parts supplied assuring us that the replacement part worked better than the original!

*The Association of Industrial Laser Users (AILU) is looking to start a "Table top laser machine" safety group, as it is only a matter of time before someone is seriously hurt. Contact details can be found at [www.ailu.org.uk](http://www.ailu.org.uk)*

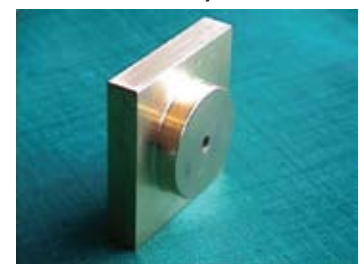
## Cost-effective metal parts

Along with laser grade mirrors, LBP also make cost-effective metal or gold coated parts to a lower specification. For example structures to be used as heat sinks, laser diode sub mounts, bases for Thermo Electric Coolers, crystal carriers, radiation shields etc.



## Square peg in a round hole ?

This is a nice solution of how to get a square mirror in a circular mount. It's not possible with glass of course, but with all metal mirrors if it can be machined, we can polish and coat it. The circular "boss" on the rear is 25mm diameter, and the mirror is Gold coated Copper. This was used in the development of Uranium enrichment by lasers.



**Contact us for help, information and prices:**

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