



## Diode Laser Furnace 670.31

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This heater is powered by a continuous high-performance diode laser (30 W). Its narrow band emissions in near infrared are focussed on the rotating sample capillaries by specially developed cylinder lens optics.

Its line focus is 0.3 x 10mm in cross-section, thus ideally illuminating the centre of the capillaries. The sample powder is mixed with fine-grained Pt powder at a ratio of approximately 1:1 and then inserted into the capillaries.

The Pt powder is required for two reasons:

1. It absorbs the infrared laser radiation, thus heating up and in turn passing the heat energy on to the surrounding sample crystallites.
2. The cubic crystal lattice of the Pt particles expands isotropically, causing a temperature-dependent deflection of its X-ray diffraction lines towards smaller Bragg angles.

As the corresponding function is known, it is possible to determine the sample temperature from the positions of the Pt-peaks with an accuracy of +/- 30 K. As the Quartz capillaries start to lose rigidity at approximately 1500° C, they can only be used for short periods of time at such high temperatures. It is possible to attain higher temperatures with ceramic capillaries, the limiting factor being the melting point of the Pt particles at 1772°C.

The diode laser furnace 670.31 is supplied with an adjustable power supply with a RS232 interface and a closed-loop water cooling system. The optical laser output and thus the temperature is controlled by the power supply to the laser diodes. The water cooling system is equipped with a cooling compressor as well as several safety features. A quotiential pyrometer is optionally available for temperature measurements.

