Laser Dilatometer L75

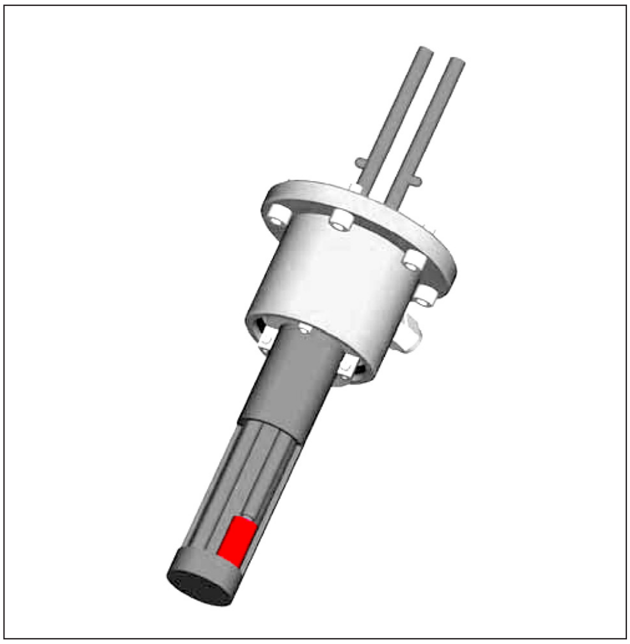
LINSEIS

Normally available dilatometers of the series L75 which use the push rod principle of measurement are successfully available in the market since 1957. As a further total new development Linseis is now offering a Laser Dilatometer built after the Michelson-Interferometer principle.

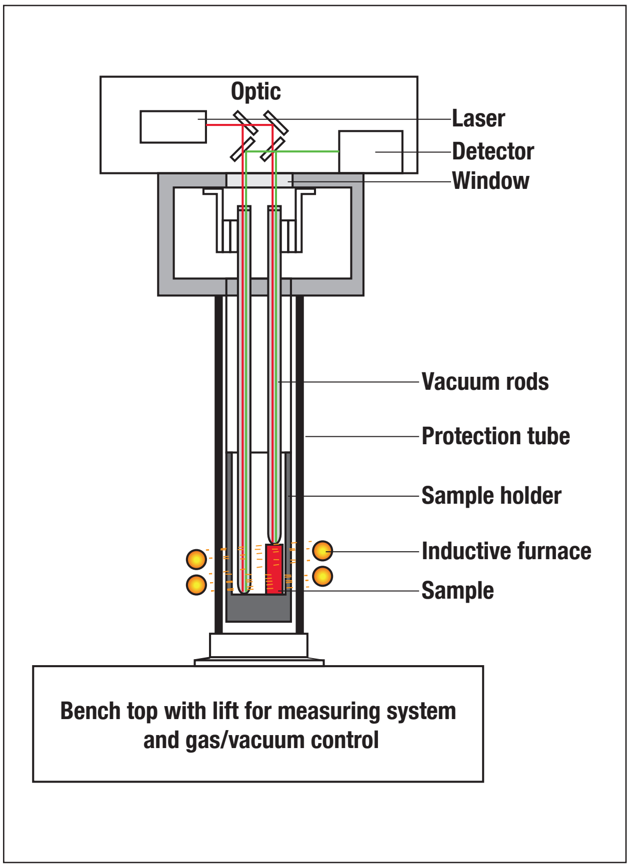
The original push rod dilatometer is based on a development made by Dr.Max Linseis in the early 1950^{th}. In those days the principle used was the same as today, using a measuring tube in which the sample is placed. The expansion signal of the sample is transmitted through a push rod onto a LVDT sensor (linear variable differential transformer). This sensor has theoretically an indefinite resolution. The push rod, which transmits expansion Together with other system components and the following evaluation electronics a maximum resolution of 10nm can be obtained.

The push rod, which transmits expansion signal from the sample to the sensor, always covers a temperature gradient of up to 1600°C from end to end, sometimes even up to 2400°C. It is understandable that these high temperatures differences on these short dimensions makes it very important for good reproducible results, to insure very good thermal conditioning of the push rod / measuring system. If this expansion transmitting part will see a different thermal history from run to run, the reproducibility can not be best. In order to get best results, identical conditions from run to run are a must.

For example the room temperature, the start temperature, the heat up speed and the used sample atmosphere etc. have all to be identical.



A further increase of resolution, as well of the absolute accuracy is now also possible through the new development of the LINSEIS Laser Dilatometer of the Pico-series. As the name indicates already the resolution goes up to Picometers (0,3nm = 300 Picometer). That means resolutions can be obtained which are up to a factor 33,33 higher as the resolution that were possible up to date. On top the principle of interference measurement give the possibility for much higher accuracy• s, especially as some special computer calibrations are used. Up to now absolute accuracy• s of 1% were normal, with best accuracy• s up to 100nm. The new method allows accuracy• s up to 30nm.



Range	20 mm
Resolution	± 1 nm (±0.3 nm typical)
Accuracy	± 50 nm
Reproducibility	± 10 nm
Wave length	632.8 nm
Ambient temperature	10 to 30°C
Sample holder	Fused silica
Push rod	Fused silica, evacuated
Heating	Inductive
Frequency range generator	150 to 400 kHz
Temperature range	RT to 1000°C
Thermocouple	Type-K (NiCr/Ni), welded to sample
Heating/cooling rate	0.1 to 99.9 K/s / 0.1 to 99.9 K/min
Dwell time	0 to 3000 s / 0 to 3000 min
Acquisition rate	max. 1000 readings/s
Power requirements	230 VAC / 16 A / 50 to 60 Hz
Power consumption generator	3.5 kVA
Cooling water	2 l/min / 5 bar
Sample/cooling gas	Inert gas, 10 l/min max. at 1 bar max.

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