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Absolute Multiline Technology

PIONEERING LENGTH METROLOGY

▶ AN ABSOLUTE INTERFEROMETER WITH UP TO 100 CHANNELS

With the **Absolute Multiline Technology** Etalon is introducing a pioneering solution to the precision measurement of length up to 20 m. This world-wide unmatched technology realises absolute measurements of long distances with interferometric accuracy: The measurement uncertainty in free air is only 0.5 ppm (parts per million = μm per m measuring length). Unlike conventional interferometers, the measurement beams can be interrupted at any time.

One **Absolute Multiline System** can drive up to 100 measurement channels, depending on the system configuration. The distance between the sensors and the system electronics can be several kilometers. The sensor signals are not affected by electromagnetically noisy environments; therefore the placing of sensors in e.g. energy chains is possible without the degradation of performance.

TECHNOLOGY SPECIFICATIONS

Uncertainty	$U_{95\%} = 0.5 \text{ ppm}$
Range	0.2 m – 20 m
Frequency	> 500 kHz in single interval
Channels	8 – 100
Laser class	II m, eye save
Traceability	Calibrated gas absorption spectrum
Compensation	temperature, pressure, humidity



- ▶ The absolute Multiline system in a rugged box for mobile application (with an 8 channel wireless temperature system)

In fractions of a second the absolute distance is recovered without loss of accuracy. The measurement channels are extremely compact: Each sensor consists of a robust fibre and a miniature optical element without any electronic components. It can measure motions of an object with a resolution of over 500 KHz during one measurement interval.

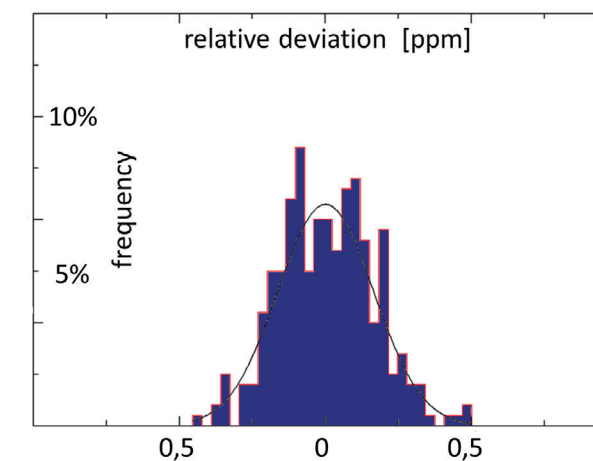
- ▶ A single measurement channel consists of a miniature optical element connected to a single fibre and a reflector

Absolute Multiline Technology



TRACEABILITY AND ACCURACY

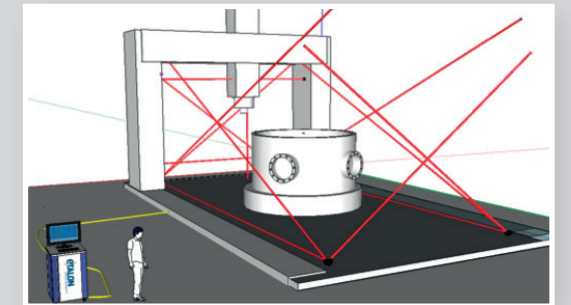
The metrological traceability is assured by an integrated gas cell with a molecular absorption spectrum that is scanned during every single measurement. The absorption spectrum stays constant over decades; therefore recalibration of the wavelength is not necessary. Comparison measurements from 0.2 m to 20 m distance at the National Physical Laboratory have proven a relative measurement uncertainty of only 0.5 ppm.



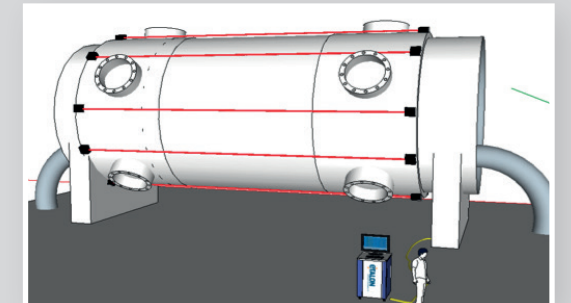
- ▶ Distribution of relative deviations between a stabilized Helium-Neon Interferometer and the Absolute Multiline System: the standard deviation is only 0.17 ppm (in air, distances 0.2 m - 20 m)

APPLICATIONS

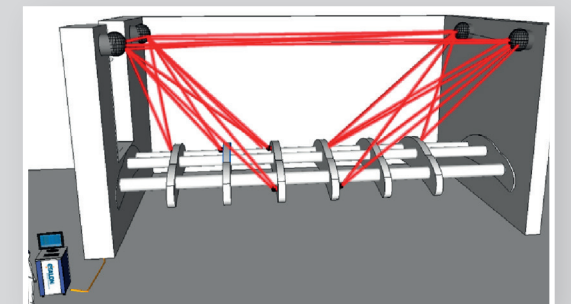
Due to its unique system characteristics the **Absolute Multiline Technology** can solve a number of challenging metrology tasks in industry. New solutions can be offered for the geometrical monitoring of mechanical systems, structures and machines. Some possible application scenarios are presented in the following sketches.



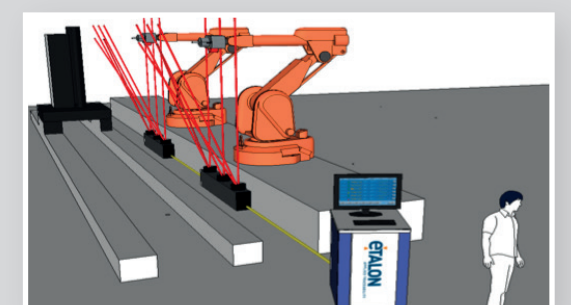
- ▶ Continuous monitoring of machines



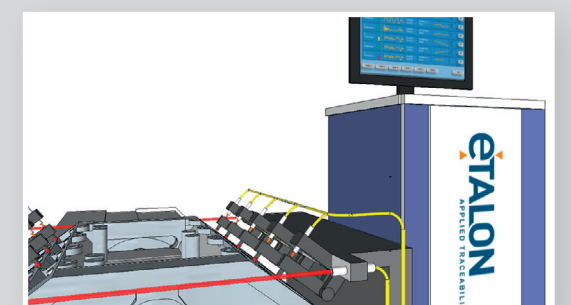
- ▶ Deformations and vibrations on mechanical systems



- ▶ Geometrical control of rigs and fixtures



- ▶ Metrological monitoring of robot installations



- ▶ Metrology system for inline measurement in production