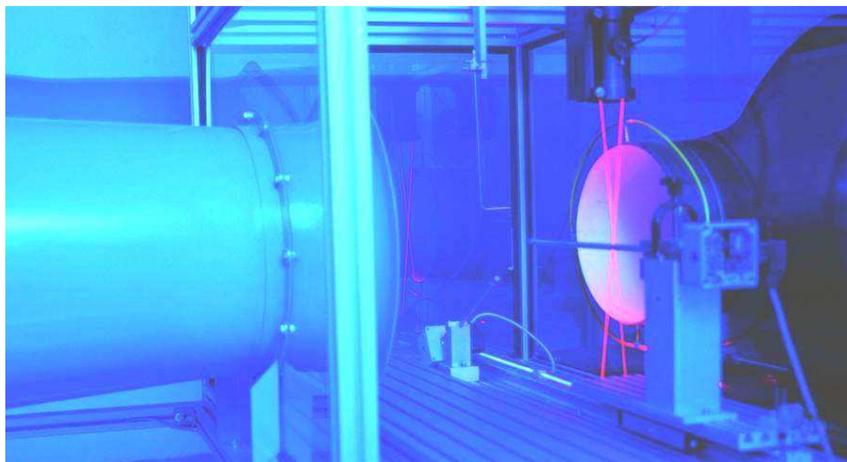
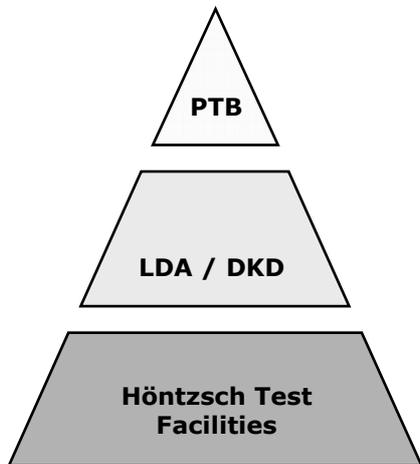


## Calibration of flow velocity and flow rate



Free jet wind tunnel WK320 with laser Doppler anemometer (LDA)

### The Höntzsch calibration system

The Höntzsch calibration process is incorporated in the Quality Management Systems QMS DIN EN ISO 9001:2008 and is carried out in close compliance with ISO/IEC/EN 17025. All Höntzsch calibrations can be attributed to national measurement standards.

Ensuring global uniformity of dimensions, Höntzsch GmbH works closely with other national and international metrological institutes. Exchange of research findings and extensive international comparisons have proved successful.

Höntzsch works resolutely and in close collaboration with national and international accredited laboratories to further develop calibration methods and reduce measuring uncertainties.

### Calibration equipment

Description	Abbreviation
Free jet wind tunnel	WK320 / LDA
Free jet wind tunnel	WK320 / Transfer
Free jet wind tunnel	WK130 / Transfer
Low velocity wind tunnel	NWK
High temperature flow test bench	HTP
High pressure flow rate test bench	HDVP
Real gas flow rate test bench	RVP
Liquid flow rate test bench	FVP
Water flow rate test bench	WVP

WK320	Göttinger free jet wind tunnel
Reference	laser Doppler anemometer (LDA)
Measuring uncertainty	0.3 %
Calibration range	<b>0.18 ... 70 m/s</b>
Calibration medium	air

WK320 / Transfer	Göttinger free jet wind tunnel
Reference	LDA calibrated transfer measurement standards
Measuring uncertainty	0.6 %
Calibration range	<b>0.18 ... 70 m/s</b>
Calibration medium	air

WK130 / Transfer	Free jet wind tunnel
Reference	LDA calibrated transfer measurement standards
Measuring uncertainty	0.6 %
Calibration range	<b>0.35 ... 30 m/s</b>
Calibration medium	air

NWK	Low velocity wind tunnel with closed test section
Reference	LDA calibrated transfer measurement standards
Measuring uncertainty	0.6 %
Calibration range	<b>0.10 ... 5.0 m/s</b>
Calibration medium	air

HTP	High temperature flow test bench in closed construction 'University of Stuttgart'
Reference	LDA calibrated transfer measurement standards
Measuring uncertainty	3 % (0.18 ... 2.0 m/s); 2 % (> 2.0 m/s)
Calibration range	<b>0.18 ... 70 m/s</b>
Temperature range	<b>+20 ... +400 °C</b>
Calibration medium	air

HDVP	High pressure flow rate test bench in closed construction
Reference	DKD calibrated transfer measurement standards
Measuring uncertainty	1 %
Calibration range	<b>0.22 ... 4000 m<sup>3</sup>/h</b> *(0.10 ... 220 Nm/s)
Pressure range	<b>1000 ... 10000 hPa</b>
Temperature range	+20 ... +45 °C
Calibration medium	air
* calculated from flow rate and average flow velocity with the respective profile factor	

RVP	Real gas flow rate test bench
Reference	LDA calibrated transfer measurement standards
Measuring uncertainty	0.8 %
Calibration range	<b>0.06 ... 100 m<sup>3</sup>/h</b> *(0.08 ... 150 Nm/s)
Pressure range	<b>1000 ... 10000 hPa</b>
Calibration medium	numerous gases
* calculated from flow rate and average flow velocity	

FVP	Liquid flow rate test bench
Reference	calibrated measuring volume / precision timing
Measuring uncertainty	1 %
Calibration range	<b>0.02 ... 9 l/min</b>
Calibration medium	numerous liquids



High temperature flow test facility HTP in closed construction 'University of Stuttgart'

WVP	Water flow rate in test bench with closed test section
Reference	electromagnetic flow rate meter
Measuring uncertainty	0.5 %
Calibration range	<b>0.5 ... 125 m<sup>3</sup>/h (equal to 0.018 ... 4.42 m/s (at Di 100 mm))</b>
Calibration medium	water

## Calibration / Measuring uncertainty / Recalibration

Höntzsch is able to carry out an optimally tailored calibration for every type of operation. As close an approximation as possible to the real conditions is achieved using a variation of pressure, temperature and type of calibration medium.

This ideal choice of calibration conditions means that measuring uncertainties in practical applications are reduced to a minimum. Höntzsch calibration certificates document the set value and actual value and provide the user with proof and reliability that faultless and accurate measuring equipment is in use for solving measuring problems.

The measuring uncertainties for the references are relative values.

The measuring uncertainties shown on the calibration certificate are determined according to the "GUIDE OF EXPRESSION OF UNCERTAINTY IN MEASUREMENT". The expanded measurement uncertainties result from the standard measurement uncertainties being multiplied with the coverage factor  $k = 2$ . The value of the measurable variable lies as a rule with a probability of approx. 95 % within the respective value interval.

It must be pointed out that additional measuring uncertainties can arise from modified application conditions. Influencing factors are, for example, pressure, temperature, flow profile and the degree of turbulence of the flow to be measured. Details regarding measuring uncertainty of each measuring system can be found in the relevant data specification.

It is the responsibility of the user to determine the re-calibration interval. The intervals should be chosen so that the re-calibration takes place before a significant change in the medium for the measurement problem. Please take into account the specific application conditions, environmental influences and the extent of potential secondary damage caused by values outside the specified tolerance.

Standards, directives or legal requirements can also determine the right time for a re-calibration.

### Höntzsch GmbH

Gottlieb-Daimler-Straße 37  
 D-71334 Waiblingen (Hegnach)  
 Telefon +49 7151 / 17 16-0  
 Telefax +49 7151 / 5 84 02  
 E-Mail info@hoentzsch.com  
 Internet www.hoentzsch.com

Subject to alteration

zertifiziert nach  
**ISO 9001 : 2008**  
 certified quality