Schweizerische Eidgenossenschaft
Confédération suisse
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Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER

State Secretariat for Economic Affairs SECO
Swiss Accreditation Service SAS

SCS Directory

Accreditation number: SCS 0155

International standard:	ISO/IEC 17025:2017
Swiss standard:	SN EN ISO/IEC 17025:2018

Testo Industrial Services AG
Calibration laboratory
Gewerbestrasse 12a
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Initial accreditation:	04.02.2020
Current accreditation:	04.02.2025 to 03.02.2030
Scope of accreditation see:	www.sas.admin.ch (Accredited bodies)

Scope of accreditation as of 04.02.2025

Calibration laboratory for electrical quantities, temperature, relative humidity, pressure, flow, rotational speed, length, torque, mass, time and frequency

Calibration and Measurement Capability (CMC)

Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1]	Remarks
ELECTRICAL MEASUREMENT				**LABORATORY AND ONSITE[2]** [2] WITH HIGHER MEASUREMENT UNCERTAINTY
DC voltage	0 V		1 µV	U = measured value Fluke 5720A
	0,01 V ... 0,22 V		$7{,}6 \cdot 10^{-6}\ U$ + 1,2 µV	m
	>0,22 V ... 2,2 V		$5{,}0 \cdot 10^{-6}\ U$ + 1,4 µV	
	>2,2 V ... 11 V		$4{,}7 \cdot 10^{-6}\ U$	
	>11 V ... 22 V		$3{,}9 \cdot 10^{-6}\ U$	
	>22 V ... 220 V		$6{,}8 \cdot 10^{-6}\ U$	
	>220 V ... 1000 V		$8{,}4 \cdot 10^{-6}\ U$	

1) The given extended measurement uncertainty is the standard uncertainty of the measurement multiplied by an extension factor k = 2, which corresponds to a confidence level of about 95% for a normal distribution.

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
DC voltage sources	0 V		1 µV	U = measured value HP 3458A
	1 mV ... 100 mV		$6{,}7 \cdot 10^{-6}\ U + 1{,}2$ µV	
	>100 mV ... 1 V		$7{,}9 \cdot 10^{-6}\ U$	
	>1 V ... 10 V		$5{,}8 \cdot 10^{-6}\ U$	
	>10 V ... 100 V		$9{,}0 \cdot 10^{-6}\ U$	
	>100 V ... 1000 V		$11 \cdot 10^{-6}\ U$	
DC current	0 A		0,2 nA	I = measured value Fluke 5720A
	10 µA ... 220 µA		$41 \cdot 10^{-6}\ I$ + 6 nA	
	>220 µA ... 2,2 mA		$36 \cdot 10^{-6}\ I$ + 7 nA	
	>2,2 mA ... 22 mA		$54 \cdot 10^{-6}\ I$	
	>22 mA ... 220 mA		$77 \cdot 10^{-6}\ I$	
	>220 mA ... 1 A		$0{,}13 \cdot 10^{-3}\ I$	
	>1 A ... 2,2 A		$92 \cdot 10^{-6}\ I$	
	>2,2 A ... 3 A		$0{,}29 \cdot 10^{-3}\ I$	Fluke 5520A/5522A
	>3 A ... 11 A		$0{,}52 \cdot 10^{-3}\ I$	
	>11 A ... 20 A		$0{,}34 \cdot 10^{-3}\ I$	Fluke 5720A mit Fluke 5220A
DC current sources	0 A		0,2 nA	I = measured value HP 3458A
	0,1 µA ... 1 µA		$0{,}29 \cdot 10^{-3}\ I$	
	>1 µA ... 10 µA		$80 \cdot 10^{-6}\ I$	
	>10 µA ... 100 µA		$67 \cdot 10^{-6}\ I$	
	>100 µA ... 10 mA		$47 \cdot 10^{-6}\ I$	
	>10 mA ... 100 mA		$57 \cdot 10^{-6}\ I$	
	>100 mA ... 1 A		$0{,}14 \cdot 10^{-3}\ I$	
	>1 A ... 10 A		$60 \cdot 10^{-6}\ I$	I = measured value voltage over normal resistence

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
DC current sources	>10 A ... 100 A		$0{,}16 \cdot 10^{-3}\ I$	
	>100 A ... 200 A		$1{,}2 \cdot 10^{-3}\ I$	
DC current clamps	>20 A ... 1000 A		$1{,}2 \cdot 10^{-3}\ I$	I = measured value
DC resistance	0 Ω		40 µ Ω	R = measured value Fluke 5720A
	1 Ω; 1,9 Ω		$95 \cdot 10^{-6}\ R$	
	10 Ω; 19 Ω		$23 \cdot 10^{-6}\ R$	
	100 Ω; 190 Ω		$10 \cdot 10^{-6}\ R$	
	1 kΩ		$8{,}5 \cdot 10^{-6}\ R$	
	1,9 kΩ		$8{,}7 \cdot 10^{-6}\ R$	
	10 kΩ; 19 kΩ		$8{,}5 \cdot 10^{-6}\ R$	
	100 kΩ; 190 kΩ		$11 \cdot 10^{-6}\ R$	
	1 MΩ		$20 \cdot 10^{-6}\ R$	
	1,9 MΩ		$22 \cdot 10^{-6}\ R$	
	10 MΩ		$40 \cdot 10^{-6}\ R$	
	19 MΩ		$47 \cdot 10^{-6}\ R$	
	100 MΩ		$0{,}11 \cdot 10^{-3}\ R$	
DC resistance	0,001 Ω ...<0,01 Ω	Normalwiderstand 0,001 Ω	$24 \cdot 10^{-3}\ R$	Substitution over normal resistence
	0,01 Ω ...<0,1 Ω	Normalwiderstand 0,01 Ω	$0{,}17 \cdot 10^{-3}\ R$	
	0,1 Ω ...<1 Ω	Normalwiderstand 0,1 Ω	$70 \cdot 10^{-6}\ R$	
	0 Ω		0,10 mΩ	R = measured value HP 3458A
	1 Ω ... 10 Ω		$13 \cdot 10^{-6}\ R$ + 35 µΩ	
	>10 Ω ... 100 Ω		$8{,}2 \cdot 10^{-6}\ R$ + 0,33 mΩ	
	>100 Ω ... 100 kΩ		$10 \cdot 10^{-6}\ R$	
	>100 kΩ ... 1 MΩ		$23 \cdot 10^{-6}\ R$	

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
DC resistance	>1 MΩ ... 10 MΩ		$0{,}10 \cdot 10^{-3}\ R$	
	>10 MΩ ... 100 MΩ		$0{,}40 \cdot 10^{-3}\ R$	
	>100 MΩ ... 1 GΩ		$3{,}4 \cdot 10^{-3}\ R$	
DC resistance (ranges) measuring devices	1 Ω ...<11 Ω		$33 \cdot 10^{-6}\ R$+ 0,78mΩ	*R* = measured value Fluke 5520A/5522A
	11 Ω ...<33 Ω		$25 \cdot 10^{-6}\ R$+ 1,2mΩ	
	33 Ω ...<110 Ω		$23 \cdot 10^{-6}\ R$+ 1,1mΩ	
	110 Ω ...<330 Ω		$23 \cdot 10^{-6}\ R$+ 1,6mΩ	
	330 Ω ...<1.1 kΩ		$23 \cdot 10^{-6}\ R$+ 1,7mΩ	
	1,1 kΩ ...<3,3 kΩ		$23 \cdot 10^{-6}\ R$+ 16mΩ	
	3,3 kΩ ...<11 kΩ		$23 \cdot 10^{-6}\ R$+ 17mΩ	
	11 kΩ ...<33 kΩ		$23 \cdot 10^{-6}\ R$+ 0,16Ω	
	33 kΩ ...<110 kΩ		$23 \cdot 10^{-6}\ R$+ 0,17Ω	
	110 kΩ ...<330 kΩ		$26 \cdot 10^{-6}\ R$+ 1,6Ω	
	330 kΩ ...<1,1MΩ		$26 \cdot 10^{-6}\ R$+ 1,7Ω	
	1,1 MΩ ...<3,3 MΩ		$71 \cdot 10^{-6}\ R$	
	3,3 MΩ ...<11 MΩ		$0{,}11 \cdot 10^{-3}\ R$	
	11 MΩ ...<33 MΩ		$0{,}37 \cdot 10^{-3}\ R$	
	33 MΩ ...<110 MΩ		$0{,}40 \cdot 10^{-3}\ R$	
	110 MΩ ...<330 MΩ		$3{,}0 \cdot 10^{-3}\ R$	
	330 MΩ ...<1,1 GΩ		$13 \cdot 10^{-3}\ R$	
AC voltage	0,01 V ... 0,022 V	10 Hz ... 40 Hz	$0{,}64 \cdot 10^{-3}\ U$	*U* =measured value Fluke 5720A
		>40 Hz ... 20 kHz	$0{,}48 \cdot 10^{-3}\ U$	
		>20 kHz ... 50 kHz	$0{,}60 \cdot 10^{-3}\ U$	
		>50 kHz ... 100 kHz	$1{,}0 \cdot 10^{-3}\ U$	
		>100 kHz ... 300 kHz	$2{,}1 \cdot 10^{-3}\ U$	
		>300 kHz ... 500 kHz	$3{,}4 \cdot 10^{-3}\ U$	

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
		>500 kHz ... 1 MHz	$4{,}7 \cdot 10^{-3}\ U$	
AC voltage	>0,022 V ... 0,22 V	10 Hz ... 40 Hz	$0{,}79 \cdot 10^{-3}\ U$	
		>40 Hz ... 20 kHz	$0{,}40 \cdot 10^{-3}\ U$	
		>20 kHz ... 50 kHz	$0{,}52 \cdot 10^{-3}\ U$	
		>50 kHz ... 100 kHz	$1{,}2 \cdot 10^{-3}\ U$	
		>100 kHz ... 300 kHz	$1{,}8 \cdot 10^{-3}\ U$	
		>300 kHz ... 500 kHz	$2{,}5 \cdot 10^{-3}\ U$	
		>500 kHz ... 1 MHz	$4{,}7 \cdot 10^{-3}\ U$	
	>0,22 V ... 2,2 V	10 Hz ... 40 Hz	$0{,}42 \cdot 10^{-3}\ U$	
		>40 Hz ... 20 kHz	$83 \cdot 10^{-6}\ U$	
		>20 kHz ... 50 kHz	$0{,}12 \cdot 10^{-3}\ U$	
		>50 kHz ... 100 kHz	$0{,}25 \cdot 10^{-3}\ U$	
		>100 kHz ... 300 kHz	$0{,}78 \cdot 10^{-3}\ U$	
		>300 kHz ... 500 kHz	$1{,}9 \cdot 10^{-3}\ U$	
		>500 kHz ... 1 MHz	$3{,}1 \cdot 10^{-3}\ U$	
	>2,2 V ... 22 V	10 Hz ... 40 Hz	$0{,}42 \cdot 10^{-3}\ U$	
		>40 Hz ... 20 kHz	$71 \cdot 10^{-6}\ U$	
		>20 kHz ... 50 kHz	$0{,}12 \cdot 10^{-3}\ U$	
		>50 kHz ... 100 kHz	$0{,}19 \cdot 10^{-3}\ U$	
		>100 kHz ... 300 kHz	$0{,}55 \cdot 10^{-3}\ U$	
		>300 kHz ... 500 kHz	$1{,}9 \cdot 10^{-3}\ U$	
		>500 kHz ... 1 MHz	$3{,}0 \cdot 10^{-3}\ U$	
	>22 V ... 220 V	10 Hz ... 40 Hz	0,42 · 10-3 U	
		>40 Hz ... 20 kHz	82 · 10-6 U	
		>20 kHz ... 50 kHz	0,13 · 10-3 U	
		>50 kHz ... 100kHz	0,27 · 10-3 U	
	>220 V ... 330 V	>50 Hz ... 1 kHz	95 · 10-6 U	*U* =measured value Fluke 5720A

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
		>1 kHz ... 10 kHz	0,30 · 10-3 U	*U* =measured value Fluke 5522A
		>10 kHz ... 20 kHz	0,34 · 10-3 U	
		>20 kHz ... 50 kHz	0,38 · 10-3 U	
		>50 kHz ... 100 kHz	2,7 · 10-3 U	
	>330 V ... 1000 V	>50 Hz ... 1 kHz	95 · 10-6 U	*U* =measured value Fluke 5720A
		>1 kHz ... 5 kHz	0,22 · 10-3 U	*U* =measured value Fluke 5522A
		>5 kHz ... 10 kHz	0,26 · 10-3 U	
AC voltage source	0,01 V ... 0,1 V	40 Hz ... 1 kHz	0,20 · 10-3 U	*U* = measured value HP 3458A
		>1 kHz ... 20 kHz	0,24 · 10-3 U	
		>20 kHz ... 50 kHz	0,34 · 10-3 U	
	>0,1 V ... 10 V	40 Hz ... 1 kHz	0,18 · 10-3 U	
		>1 kHz ... 20 kHz	0,23 · 10-3 U	
		>20 kHz ... 50 kHz	0,33 · 10-3 U	
	>10 V ... 100 V	40 Hz ... 1 kHz	0,27 · 10-3 U	
		>1 kHz ... 20 kHz	0,27 · 10-3 U	
		>20 kHz ... 50 kHz	0,37 · 10-3 U	
	>100 V ... 700 V	40 Hz ... 1 kHz	0,41 · 10-3 U	
AC current	0,1 mA ... 0,22 mA	10 Hz ... 40 Hz	0,42 · 10-3 I	*I* = measured value Fluke 5720A
		>40 Hz ... 1 kHz	0,20 · 10-3 I	
		>1 kHz ... 5 kHz	0,40 · 10-3 I	
		>5 kHz ... 10 kHz	1,8 · 10-3 I	
	0,1mA ... 330 µA	>10 kHz ... 30 kHz	23 · 10-3 I	*I* = Measured value Fluke 5520A/5522A
	>0,22mA ... 2,2 mA	10 Hz ... 40 Hz	0,44 · 10-3 I	*I*= Measured value Fluke 5720A
		>40 Hz ... 1 kHz	0,28 · 10-3 I	

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
		>1 kHz ... 5 kHz	0,70 · 10-3 I	
		>5 kHz ... 10 kHz	4,1 · 10-3 I	
	>0,33mA ... 3,3 mA	>10 kHz ... 30 kHz	9,2 · 10^{-3} *I*	*I* = measured value Fluke 5520A/5522A
	>2,2mA ... 22 mA	10 Hz ... 40 Hz	0,43 · 10^{-3} *I*	*I* = measured value Fluke 5720A
		>40 Hz ... 1 kHz	0,28 · 10^{-3} *I*	
		>1 kHz ... 5 kHz	0,45 · 10^{-3} *I*	
		>5 kHz ... 10 kHz	3,4 · 10^{-3} *I*	
AC current	>3,3mA ... 33 mA	>10 kHz ... 30 kHz	4,0 · 10^{-3} *I*	*I* = measured value Fluke 5520A/5522A
	>22mA ... 220 mA	10 Hz ... 40 Hz	0,43 · 10^{-3} *I*	*I* = measured value Fluke 5720A
		>40 Hz ... 1 kHz	0,24 · 10^{-3} *I*	
		>1 kHz ... 5 kHz	0,36 · 10^{-3} *I*	
		>5 kHz ... 10 kHz	1,6 · 10^{-3} *I*	
	>33mA ... 330 mA	>10 kHz ... 30 kHz	7,8 · 10^{-3} *I*	*I* = measured value Fluke 5520A/5522A
	>220 mA ... 2,2 A	20 Hz ... 1 kHz	0,42 · 10^{-3} *I*	*I* = measured value Fluke 5720A with 5220A
		>1 kHz ... 5 kHz	0,81 · 10^{-3} *I*	
		>5 kHz ... 10 kHz	7,7 · 10^{-3} *I*	
	>2,2 A ... 3 A	20 Hz ... 45 Hz	1,2 · 10^{-3} *I*	*I* = measured value Fluke 5720A with 5220A
		>45 Hz ... 1 kHz	0,55 · 10^{-3} *I*	*I* = measured value Fluke 5520A/5522A
		>1 kHz ... 2 kHz	2,3 · 10^{-3} *I*	*I* = measured value Fluke 5720A with 5220A

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		>2 kHz ... 3 kHz	$3{,}5 \cdot 10^{-3}\ I$	
		>3 kHz ... 4 kHz	$4{,}6 \cdot 10^{-3}\ I$	
		>4 kHz ... 5 kHz	$5{,}4 \cdot 10^{-3}\ I$	*I* = measured value Fluke 5520A/5522A
		>5 kHz ... 10 kHz	$23 \cdot 10^{-3}\ I$	
	>3 A ... 20 A	10 Hz ... 100 Hz	$0{,}98 \cdot 10^{-3}\ I$	*I* = measured value Fluke 5520A/5522A
		>100 Hz ... 1 kHz	$1{,}2 \cdot 10^{-3}\ I$	*I* = measured value Fluke 5720A with 5220A
		>1 kHz ... 2 kHz	$2{,}3 \cdot 10^{-3}\ I$	
		>2 kHz ... 3 kHz	$3{,}5 \cdot 10^{-3}\ I$	
		>3 kHz ... 4 kHz	$4{,}6 \cdot 10^{-3}\ I$	
		>4 kHz ... 5 kHz	$5{,}8 \cdot 10^{-3}\ I$	
AC current sources	0,1 mA ... 100 mA	20 Hz ... 45 Hz	$2{,}3 \cdot 10^{-3}\ I$	*I* = measured value HP 3458A
		>45 Hz ... 100 Hz	$1{,}7 \cdot 10^{-3}\ I$	
		>100 Hz ... 5 kHz	$1{,}5 \cdot 10^{-3}\ I$	
	>100 mA ... 1 A	20 Hz ... 45 Hz	$2{,}4 \cdot 10^{-3}\ I$	
		>45 Hz ... 100 Hz	$1{,}9 \cdot 10^{-3}\ I$	
		>100 Hz ... 5 kHz	$2{,}0 \cdot 10^{-3}\ I$	
AC current clamps	>20 A ... 1000 A	40 Hz ... 100 Hz	$3{,}1 \cdot 10^{-3}\ I$	*I* = measured value
		100 Hz ... 300 Hz	$3{,}3 \cdot 10^{-3}\ I$	
AC current active power measuring instruments	109 µW ... 33 W	33 mV ... 1000 V 45 Hz ... 65 Hz; *PF*=1 3,3 mA ...<33 mA	$0{,}85 \cdot 10^{-3}\ P$	*P* = measured value with Fluke 5520A/5522A *PF*: Powerfactor (cos φ), φ: phase angle

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	1,09 mW ... 330 W	33 mV ... 1000 V 45 Hz ... 65 Hz; *PF*=1 33 mA ...<330 mA	$0{,}84 \cdot 10^{-3}\ P$	
	10,9 mW ... 1,1 kW	33 mV ... 1000 V 45 Hz ... 65 Hz; *PF*=1 330 mA ...<1,1 A	$0{,}69 \cdot 10^{-3}\ P$	
	36,3 mW ... 3,0 kW	33 mV ... 1000 V 45 Hz ... 65 Hz; *PF*=1 1,1 A ...<3 A	$0{,}62 \cdot 10^{-3}\ P$	
	99 mW ... 11 kW	33 mV ... 1000 V 45 Hz ... 65 Hz; *PF*=1 3 A ...<11 A	$1{,}0 \cdot 10^{-3}\ P$	
	363 mW ... 20 kW	33 mV ... 1000 V 45 Hz ... 65 Hz; *PF*=1 11 A ...<20,5 A	$1{,}3 \cdot 10^{-3}\ P$	
DC active power measuring instruments	10,9 µW ... 3,3 W	33 mV ... 1000 V 0,33 mA ...<3,3 mA	$0{,}20 \cdot 10^{-3}\ P$	*P* = measured value with Fluke 5520A/5522A
	109 µW ... 33 W	33 mV ... 1000 V 3,3 mA ...<33 mA	$0{,}15 \cdot 10^{-3}\ P$	
	1,09 mW ... 330 W	33 mV ... 1000 V 33 mA ...<330 mA	$0{,}15 \cdot 10^{-3}\ P$	
	10,9 mW ... 1,1 kW	33 mV ... 1000 V 330 mA ...<1,1 A	$0{,}26 \cdot 10^{-3}\ P$	
	36,3 mW ... 3,0 kW	33 mV ... 1000 V 1,1 A ...<3,0 A	$0{,}30 \cdot 10^{-3}\ P$	
	99 mW ... 11 kW	33 mV ... 1000 V 3,0 mA ...<11 A	$0{,}52 \cdot 10^{-3}\ P$	
	363 mW ... 20 kW	33 mV ... 1000 V 11 A ...<20 A	$0{,}83 \cdot 10^{-3}\ P$	
Oscilloscopes Vertical deflection	5 mV ...<25 mV	*Ri* = 50 Ω Rechteckspannung 10 Hz ... 10 kHz	$2{,}0 \cdot 10^{-3}\ U$ + 16 µV	*U* = measured value
	25 mV ...<110 mV		$1{,}9 \cdot 10^{-3}\ U$ + 16 µV	
	0,11V ...<2,2 V		$1{,}9 \cdot 10^{-3}\ U$ + 33 µV	

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	2,2 V ...<6 V		$1{,}9 \cdot 10^{-3}\ U + 0{,}29$ mV	
	5 mV ...<25 mV	*R*i = 1 MΩ Rechteckspannung 10 Hz ... 10 kHz	$0{,}74 \cdot 10^{-3}\ U + 16$ µV	
	25 mV ...<110 mV		$0{,}43 \cdot 10^{-3}\ U + 16$ µV	
	0,11V ...<2,2 V		$0{,}39 \cdot 10^{-3}\ U + 33$ µV	
	2,2 V ...<11 V		$0{,}39 \cdot 10^{-3}\ U + 0{,}29$ mV	
	11 V ... 130 V		$0{,}39 \cdot 10^{-3}\ U + 2{,}9$ mV	
Oscilloscopes Horizontal deflection	5 ns ... 5 s	*R*i = 50 Ω	$0{,}5 \cdot 10^{-6}\ t + 0{,}3$ ns	*t* = measured value
Oscilloscopes Rise time	600 ps ... 10 ms	25 mV ... 1V *R*i = 50 Ω	$37 \cdot 10^{-3}\ t$	
Frequency measu-rement	1mHz ... 1 GHz		$5 \cdot 10^{-11}$ f	*f* = measured value
Period duration	1µs ... 1000s		$5 \cdot 10^{-11}$ t	*t* = measured value
Time interval	2 s ... 48 h	Auflösung: 1/100 s 1/10 s 2/10 s 1 s	 93 ms 0,24 s 0,37 s 1,1 s	stop watch
Capacity measuring instruments	190pF ...<400pF	10Hz ... 10kHz	$3{,}9 \cdot 10^{-3}$ C + 7,8 pF	*C*= Measured value with Fluke 5520A/5522A
	400pF ... <1,1nF	10Hz ... 10kHz	$3{,}9 \cdot 10^{-3}$ C + 7,8 pF	
	1,1nF ... <3,3nF	10Hz ... 3kHz	$4{,}0 \cdot 10^{-3}$ C + 7,8 pF	
	3,3nF ...<11nF	10Hz ... 1kHz	$2{,}0 \cdot 10^{-3}$ C + 7,8 pF	
	11nF ...<33nF	10Hz ... 1kHz	$2{,}3 \cdot 10^{-3}$ C + 78 pF	
	33nF ...<110nF	10Hz ... 1kHz	$2{,}0 \cdot 10^{-3}$ C + 78 pF	
	110nF ...<330nF	10Hz ... 1kHz	$4{,}2 \cdot 10^{-3}$ C	
	330nF ...<1,1µF	10Hz ... 600Hz	$4{,}3 \cdot 10^{-3}$ C	
	1,1µF ...<3,3µF	10Hz ... 300Hz	$4{,}8 \cdot 10^{-3}$ C	

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	3,3µF ...<11µF	10Hz ... 150Hz	$5{,}0 \cdot 10^{-3}$ C	
	11µF ...<33µF	10Hz ... 120Hz	$5{,}8 \cdot 10^{-3}$ C	
	33µF ...<110µF	10Hz ... 80Hz	$6{,}4 \cdot 10^{-3}$ C	
	110µF ...<330µF	DC ... 50Hz	$5{,}6 \cdot 10^{-3}$ C	
	330µF ...<1,1mF	DC ... 20Hz	$5{,}8 \cdot 10^{-3}$ C	
	1,1mF ...<3,3mF	DC ... 6Hz	$5{,}6 \cdot 10^{-3}$ C	
	3,3mF ...<11mF	DC ... 2Hz	$5{,}8 \cdot 10^{-3}$ C	
	11mF ...<33mF	DC ... 0,6Hz	$7{,}9 \cdot 10^{-3}$ C	
	33mF ...<110mF	DC ... 0,2Hz	$11 \cdot 10^{-3}$ C	
Temperature indicators and -simulators for resistance thermometer	-200°C ... 850°C		30 mK	Characteristic curve according DIN EN 60751:2009
Temperature indicators and -simulators of precious metal thermocouples	-200°C ... 1750°C		68 mK	Characteristic curve according DIN EN 60584-1:2014
Temperature indicators and -simulators for resistance thermometer of Non-precious metal thermocouples	-200°C ... 1300°C		25 mK	
TEMPERATURE				**LABORATORY**
Ice Point	0°C	Ice-water mixture from deionised Water according VDE 0510	5,0 mK	
Resistance thermometers (with and without display) electrical thermometers with resistance	-100°C …<-80°C	mathematical extrapolation of the thermomechanical characteristic curve	70 mK	comparison with standard reference resistance thermometer

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
sensor with display / digital output)		of the calibration values for the range from -80 °C ... 0 °C		
	-80°C ... 0°C	stirred liquid bath	15 mK	
	>0°C ... 200°C		19 mK	
	>200°C ... 300°C	block calibrator	0,68 K	
	>300°C ... 500°C		0,85 K	
Temperature Precious metal thermocouples (with and without display)	>0°C ... 100°C	stirred liquid bath	0,89 K	comparison with standard reference resistance thermometer
	>100°C ... 200°C		0,70 K	
	>200°C ... 500°C	block calibrator	1,0 K	comparison with standard reference thermo-meter
	>500°C ... 1000°C		1,1 K	
Temperature Non-precious metal thermocouples	-100°C …<-80°C	mathematical extrapolation of the thermocouple characteristic curve of the calibration values for the range from -80°C...0°C	0,21 K	comparison with standard reference resistance thermometer
	-80°C ... 200°C	liquid bath	0,17 K	
	>200°C ... 500°C	block calibrator	0,86 K	comparison with Standard Reference thermocouple
	>500°C ... 1000°C		1,2 K	
Temperature measuring instruments, data loggers	-40°C ... -5°C	in the temperature cabinet	0,29 K	comparison with Standard Reference resistance thermometer
	>-5°C ... 5°C		0,25 K	
	>5°C ... 50°C		0,15 K	
	>50°C ... 80°C		0,22 K	
	>80°C ... 120°C		0,39 K	

1) The given extended measurement uncertainty is the standard uncertainty of the measurement multiplied by an extension factor k = 2, which corresponds to a confidence level of about 95% for a normal distribution.

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
	>120°C ... 180°C		0,88 K	
Radiation thermometer	-30°C ... 150°C	Calibration with black spotlight	1,2 K	Comparison with Standard Reference resistance thermometer with black spotlight
Surface temperature sensor	-20°C ... 100°C	Calibration of tempered surface	0,92 K	Comparison with Standard Reference resistance thermometer of tempered surface
	>100°C ... 180°C		1,4 K	
	>180°C ... 300°C		2,2 K	
Temperature block calibrators	-100°C ...<-80°C		0,33 K	Comparison with Standard Reference resistance thermometer
	-80°C ... 100°C		0,13 K	
Temperature block calibrators	>100°C ... 200°C		0,28 K	
	>200°C ... 300°C		0,29 K	
	>300°C ... 1000°C		1,2 K	
Circulating Bath (in a defined useable volume)	-100°C ... 0°C	Calibration at defined positions in useable volume	0,30 K	Comparison with Standard Reference resistance thermometer
	>0°C ... 100°C		0,30 K	
	>100°C ... 200°C		0,30 K	
	>200°C ... 400°C		1,0 K	
TEMPERATURE				**ONSITE**
Ice Point	0°C	Ice-water mixture from deionised Water according VDE 0510	5,0 mK	
Resistance thermometers with display / electric thermometers with	-100°C ... 0°C	Block calibrator	0,39 K	Comparison with Standard Reference resistance thermometer

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
resistance sensor with display / digital output Glass thermometer				
	>0°C ... 100°C		0,38 K	
	>100°C ... 200°C		0,38 K	
	>200°C ... 400°C		0,98 K	
Thermocouples with display	0°C ... 100°C	Block calibrator	0,95 K	
	>100°C ... 700°C		1,6 K	
	>700°C … 1000°C		3,3 K	
Radiation thermom-eter	-20°C ... 150°C	Calibration with black spotlight	1,2 K	Comparison with Standard Reference resistance ther-mometer with black spotlight
Surface tempera-ture sensor	-20°C ... 150°C	Calibration without tempered surface	1,5 K	Comparison with Standard Reference resistance thermom-eter of tempered surface
Temperature Data logger	5°C ... 50°C	in the temperature cabinet	0,28 K	Comparison with Standard Reference resistance thermo-meter
Temperature block calibrators	-100°C … 0°C		0,33 K	Comparison with Standard Reference resistance thermo-meter
	>0°C … 100°C		0,31 K	
	>100°C … 200°C		0,31 K	
	>200°C … 400°C		0,95 K	
	>400°C … 1000°C		2,0 K	Comparison with Standard Reference thermocouple
Circulating Bath (in a defined usea-ble volume)	-100°C ... 0°C	Calibration at de-fined positions in useable volume	0,29 K	Comparison with Standard Reference thermocouple

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Accreditation number: SCS 0155

Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
	>0°C ... 100°C		0,28 K	
	>100°C ... 200°C		0,28 K	
	>200°C ... 400°C		0,95 K	
RELATIVE HUMIDITY AND DEW POINT TEMPERATURE				**LABORATORY**
Humidity sensor, Data logger and transmitters (relative humidity in the humidity generator with defined reduced volume for calibration (flow box))	10%rF ... 30%rF	-10°C - 0°C	0,38%rF	2-pressure / 2-temperature humidity generator
	>30%rF ... 50%rF		0,40%rF	
	>50%rF ... 70%rF		0,54%rF	
	>70%rF ... 80%rF		0,66%rF	
	>80%rF ... 90%rF		1,1%rF	
	10%rF ... 30%rF	>0°C - 70°C	0,20%rF	
	>30%rF ... 50%rF		0,25%rF	
	>50%rF ... 70%rF		0,44%rF	
	>70%rF ... 80%rF		0,58%rF	
	>80%rF ... 90%rF		1,1%rF	
Humidity sensor, Data logger and transmitters (relative humidity in the humidity generator (Usage of entire volume for calibration))	10%rF ... 50%rF	-10°C - 0°C	1,1%rF	2-pressure / 2-temperature
	>50%rF ... 80%rF		1,2%rF	
	>80%rF ... 90%rF		1,5%rF	
	10%rF ... 30%rF	>0°C - 30°C	0,46%rF	humidity generator
	>30%rF ... 50%rF		0,48%rF	
	>50%rF ... 70%rF		0,58%rF	
	>70%rF ... 80%rF		0,70%rF	

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
	>80%rF ... 90%rF		1,2%rF	
	10%rF ... 30%rF	>30°C - 50°C	0,78%rF	
	>30%rF ... 50%rF		0,79%rF	
	>50%rF ... 70%rF		0,87%rF	
	>70%rF ... 80%rF		0,95%rF	
	>80%rF ... 90%rF		1,3%rF	
	10%rF ... 30%rF	>50°C - 70°C	0,97%rF	
	>30%rF ... 50%rF		0,98%rF	
	>50%rF ... 70%rF		1,0%rF	
	>70%rF ... 80%rF		1,1%rF	
	>80%rF ... 90%rF		1,4%rF	
Dew point hygrometer Dew point temperature in humidity generator with defined reduced volume for calibration (flow box))	-35,9°Ctp ... -20,2°Ctp	10%rF ... 20%rF	27 mK	2-pressure / 2-temperature humidity generator (Temperature range -10°C ... 0°C)
	-28,8°C ... -15,4°C	>20%rF ... 30%rF	30 mK	
	-24,3°C ... -9,1°C	>30%rF ... 50%rF	57 mK	
	-18,5°C ... -4,8°CC	>50%rF ... 70%rF	0,13 K	
	-14,4°C ... -3,0°C	>70%rF ... 80%rF	0,18 K	
	-12,8°C ... -1,4°C	>80%rF ... 90%rF	0,35 K	
	-27,8°C ... 36,8°C	10%rF ... 20%rF	22 mK	2-pressure / 2-temperature humidity generator (Temperature range >0 °C to 70°C)
	-20,1°C ... 44,5°C	>20%rF ... 30%rF	25 mK	
	-15,4°C ... 54,8°C	>30%rF ... 50%rF	54 mK	
	-9,1°C ... 62,0°C	>50%rF ... 70%rF	0,13 K	
	-4,8°C ... 64,9°C	>70%rF ... 80%rF	0,18 K	

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Accreditation number: SCS 0155

Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
	-3,0°C ... 68,0°C	>80%rF ... 90%rF	0,35 K	
RELATIVE HUMIDITY AND DEW POINT TEMPERATURE				**ONSITE**
relative humidity hygrometer, data logger, transmitters	10%rF ... 90%rF	5°C - 50°C	1,8%rF	humidity generator
PRESSURE				**LABORATORY**
Absolute pressure	0,03 bar ... 4.3 bar		0,20 mbar	Pressure medium: Gas
	>4,3 bar … 11 bar		$53 \cdot 10^{-6}$ p + 22 µbar	
	>11 bar … 17,5 bar		1,0 mbar	
	>17,5 bar … 51 bar		$45 \cdot 10^{-6}$ p + 0,28 mbar	
	>51 bar … 101bar		$37 \cdot 10^{-6}$ p + 1.5 mbar	
	>101 bar ... 211 bar		$54 \cdot 10^{-6}$ p + 0,82 mbar	
Negative and positive overpressure and differential pressure	-3,6 mbar … 3,6 mbar		1,5 µbar	
	-50 mbar ... 50 mbar		$0{,}11 \cdot 10^{-3}$ p + 2,0 µbar	
	-250 mbar ... 250 mbar		$0{,}11 \cdot 10^{-3}$ p + 5,0 µbar	
Negative and positive overpressure	-1,0 bar ... 3,3 bar		0,20 mbar	
	>3,3 bar … 10 bar		$53 \cdot 10^{-6}$ p + 22 µbar	
	>10 bar … 16,5 bar		1,0 mbar	
	>16,5 bar … 50 bar		$45 \cdot 10^{-6}$ p + 0,28 mbar	

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
	>50 bar … 100 bar		$37 \cdot 10^{-6}$ p + 1.5 mbar	
	>100 bar ... 210 bar		$54 \cdot 10^{-6}$ p + 0,82 mbar	
positive overpressure	0,0 bar ... 600 bar		0,07 bar	Pressure medium: oil/water
PRESSURE				**ONSITE**
pressure	-1 … 20 bar relative		48 mbar	Pressure medium: gas
	0 … 21 bar absolute		48 mbar	
	-0,4bar … 0,4 bar		0,6 mbar	
	0 bar … 600 bar		0,25 bar	Pressure medium: water
	-1 hPa … 1 hPa		0,01 hPa	Pressure medium: gas
	-10 hPa … 10 hPa		0,02 hPa	
FLOW QUANTITIES				**LABORATORY**
Anemometer 100mm	0,3 m/s ... 2 m/s	Probes of comparable construction	0,068 m/s	Calibration at flow path with comparison probe
	>2 m/s ... 5 m/s		0,12 m/s	
	>5 m/s ... 15 m/s		0,19 m/s	
Anemometer 60mm	0,3 m/s ... 2 m/s	Probes of comparable construction	0,043 m/s	
	>2 m/s ... 5 m/s		0,071 m/s	
	>5 m/s ... 10 m/s		0,094 m/s	
	>10 m/s ... 20 m/s		0,15 m/s	
Anemometer 25mm	0,5 m/s ... 10 m/s	Probes of comparable construction	0,17 m/s	
	>10 m/s ... 20 m/s		0,33 m/s	
Anemometer 16mm	0,6 m/s ... 10 m/s	Probes of comparable construction	0,16 m/s	
	>10 m/s ... 20 m/s		0,27 m/s	

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
Anemometer 12mm	0,6 m/s ... 10 m/s	Probes of comparable construction	0,19 m/s	
	>10 m/s ... 20 m/s		0,37 m/s	
Anemometer triple probe	0,1 m/s ... 2 m/s	Probes of comparable construction	0,087 m/s	
	>2 m/s ... 10 m/s		0,37 m/s	
	>10 m/s ... 20 m/s		0,68 m/s	
Anemometer heat wire	0,1 m/s ... 2 m/s	Probes of comparable construction	0,096 m/s	
	>2 m/s ... 5 m/s		0,12 m/s	
	>5 m/s ... 10 m/s		0,27 m/s	
	>10 m/s ... 20 m/s		0,40 m/s	
Anemometer heat sphere	0,1 m/s ... 2 m/s	Probes of comparable construction	0,25 m/s	
	>2 m/s ... 5 m/s		0,36 m/s	
	>5 m/s ... 10 m/s		0,48 m/s	
ROTATIONAL SPEED				**LABORATORY**
Mechanical & Optical	1 rpm ... 10 rpm		$5{,}4 \cdot 10^{-3}$ rpm	Mechanical and optical at rotational speed generator
	>10 rpm ... 100 rpm		$50 \cdot 10^{-3}$ rpm	
	>100 rpm ... 500 rpm		0,12 rpm	
Mechanical & Optical	>500 rpm ... 1’000 rpm		0,28 rpm	
	>1’000 rpm ... 3’000 rpm		1,2 rpm	
	>3’000 rpm ... 6’000 rpm		1,5 rpm	
	>6’000 rpm ... 12’000 rpm		1,8 rpm	
Optical simulation	1 rpm ... 60 rpm		$0{,}53 \cdot 10^{-3}$ rpm	optical simulation at functiongenerator
	>60 rpm ... 600 rpm		$2{,}5 \cdot 10^{-3}$ rpm	

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
	>600 rpm ... 6'000 rpm		$2{,}6 \cdot 10^{-3}$ rpm	
	>6'000 rpm ... 60'000 rpm		$4{,}0 \cdot 10^{-3}$ rpm	
	>60'000 rpm ... 120'000 rpm		$7{,}0 \cdot 10^{-3}$ rpm	
DIMENSIONAL QUANTITIES				**LABORATORY**
Ring gauges / Plug gauges	1 mm ... 200 mm	VDI/VDE/DGQ 2618 Sheet 4,1	0,8 µm + $1 \cdot 10^{-6} \cdot l$	l = measured length
Length of plane-parallel, spherical or cylindrical measuring surfaces	0,05 mm ... 1000 mm	VDI/VDE/DGQ 2618 Sheet 4.4/19.1	1,0 µm + $2 \cdot 10^{-6} \cdot l$	l = measured length
Pin gauge	0,1 mm ... 30 mm	VDI/VDE/DGQ 2618 Sheet 4.2	0,8 µm + $1 \cdot 10^{-6} \cdot l$	l = measured length
Snap gauges	… 200 mm	VDI/VDE/DGQ 2618 Sheet 4.7	0,8 µm + $2 \cdot 10^{-6} \cdot l$	l = measured length
Thread plug simple pitch diameter	1,4 mm ... 200 mm nominal pitch: 0,3 mm ... 6 mm	VDI/VDE/DGQ 2618 Sheet 4.8	3 µm + $2 \cdot 10^{-6} \cdot l$	l = measured length
Thread ring simple pitch diameter	3 mm ... 200 mm nominal pitch: 0,5 mm ... 6 mm	VDI/VDE/DGQ 2618 Sheet 4.8	3 µm + $3 \cdot 10^{-6} \cdot d$	l = measured length
Calipers for outside, inside and depth measurements	0 mm ... 1000 mm	VDI/VDE/DGQ 2618 Sheet 9.1	22 µm + $28 \cdot 10^{-6} \cdot l$	l = measured length
Depth gauge calipers	0 mm ... 1000 mm	VDI/VDE/DGQ 2618 Sheet 9.2	22 µm + $28 \cdot 10^{-6} \cdot l$	l = measured length
Height gauge calipers	0 mm ... 1000 mm	VDI/VDE/DGQ 2618 Sheet 9.3	22 µm + $28 \cdot 10^{-6} \cdot l$	l = measured length
Micrometer	0 mm ... 500 mm	VDI/VDE/DGQ 2618 Sheet 10.1	2,5 µm + $12 \cdot 10^{-6} \cdot l$	l = measured length
Micrometer head	… 50 mm	VDI/VDE/DGQ 2618 Sheet 10.4/19.1	1,9 µm + $4{,}6 \cdot 10^{-6} \cdot l$	l = measured length
Micrometer with dial	… 100 mm	VDI/VDE/DGQ 2618 Sheet 10.3	1,9 µm + $4{,}6 \cdot 10^{-6} \cdot l$	l = measured length

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
Lever-gauges measuring instruments (quick-action probes) for inside and external measurements	… 200 mm	VDI/VDE/DGQ 2618 Sheet 12.1/13.1	5 µm + 6,8 · 10^{-6}· *l*	*l* = measured length
Dial indicator (dial gauge)	… 100 mm	VDI/VDE/DGQ 2618 Sheet 11.1	3 µm + 1 · 10^{-6}· *l*	*l* = measured length
Dial comparator (precision pointer)	… 3 mm	VDI/VDE/DGQ 2618 Sheet 11.2	0,6 µm	
lever gauge	… 3 mm	VDI/VDE/DGQ 2618 Blatt 11.3	1,5µm + 0,3 · 10^{-6}· *l*	
Electronic length instruments: - inductive - incremental	 … 10 mm … 100 mm	VDI/VDE/DGQ 2618 Sheet 14.1/19.1	0,6 µm + 1 · 10^{-6}· *l*	*l* = measured length
2-point internal micrometers	13 mm ... 1000 mm	VDI/VDE/DGQ 2618 Sheet 10.7	1,9 µm + 4,6 · 10^{-6}· *l*	*l* = measured length
3-point internal micrometers	3 mm ... 150 mm	VDI/VDE/DGQ 2618 Sheet 10.8	2,4 µm + 4,3 · 10^{-6}· *l*	*l* = measured length
Depth caliper withextension	0 mm ... 500 mm	VDI/VDE/DGQ 2618 Sheet 10.5	2,5 µm + 12 · 10^{-6}· *l*	*l* = measured length
Height gauges	0 mm … 1000 mm	VDI/VDE/DGQ 2618 Sheet 16.1	0,67 µm+2,3 · 10^{-6}· *l*	*l* = measured length
Flat / bevelled square	0 mm ... 600 mm	VDI/VDE/DGQ 2618 Blatt 7.1	1,1 µm	
Straight edge	0 mm ... 1000 mm	VDI/VDE/DGQ 2618 Blatt 5.1	1,2 µm	
Gauge blocks DIN EN ISO 3650 Central length	0,5 mm ... 100 mm	VDI/VDE/DGQ 2618 Sheet 3.1	0,09 µm + 0,2 ·10^{-6}·*l*	*l* = measured length
Steel	0,5 mm ... 131.4 mm	VDI/VDE/DGQ 2618 Blatt 3.1	0,07 µm + 1,0 ·10^{-6}· *l*	*l* = measured length
Ceramics	0,5 mm ... 131.4 mm	VDI/VDE/DGQ 2618 Blatt 3.1	0,08 µm + 1,0 ·10^{-6}· *l*	*l* = measured length
Tungsten carbide	0,5 mm ... 131.4 mm	VDI/VDE/DGQ 2618 Blatt 3.1	0,11 µm + 0,9 ·10^{-6}· *l*	*l* = measured length

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]		Remarks
Variation in length		VDI/VDE/DGQ 2618 Sheet 3.1	0,07 µm		
DIMENSIONAL QUANTITIES					**ONSITE**
Height gauges	0 mm ... 1000 mm	VDI/VDE/DGQ 2618 Blatt 16.1	0,67 µm+2,3 · 10^{-6} · *l*		*l* = measured length
3-DIMENSIONAL QUANTITIES					**LABORATORY**
Gauges and reference gauges	Coordinate measuring machine with calibrated measuring volume of: X = 800 mm Y = 600 mm Z = 300 mm	tactile und optical measurement	related to defined size measurements of 100 mm		using coordinate measuring machine; measurement uncertainty estimation according VDI/VDE/DGQ 2617 Blatt 11
Size:			tactile	optical	measurement uncertainty can vary significantly from the uncertainty shown in the example of simple measuring tasks
diameter			2,0 µm	2,0 µm	
distance			1,9 µm	2,0 µm	
angle			0,0024°	0,0026°	
Form:					
straightness			1,8 µm	2,0 µm	
flatness			1,8 µm	2,1 µm	
roundness			2,3 µm	2,5 µm	
parallelism			4,2 µm	4,5 µm	
coaxiality			0,7 µm	0,8 µm	
run out			6,9 µm	7,1 µm	
total run out			6,9 µm	7,1 µm	
TORQUE					**LABORATORY**
Torque hand-operated torque screwdriver / triggering / indicating	0,2 Nm ... 1000 Nm	DIN EN ISO 6789-2:2017	0,6 %, but not less than 1 Digit		
TORQUE					**ONSITE**
Torque hand-operated torque screwdriver / triggering / indicating	0,2 Nm ... 1000 Nm	DIN EN ISO 6789-2:2017	0,8 %, but not less than 1 Digit		
MECHANICAL QUANTITIES: SCALES					**ONSITE**
Weighing Scales precision scale table scale table or floor scale	1 mg … 500mg	with weights at the scale installation site	0,03 mg		

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Measured Quantity/ Instrument or Gauge	Measurement Range	Measurement Conditions	Best Measurement Uncertainty ± [1)]	Remarks
	>500 mg … 100 kg		$2.5 \cdot 10^{-5}$	

In case of contradictions in the language versions of the directories, the German version shall apply.

Abbreviation	Signification
Onsite	on-site, calibration is done at the customer / installation site

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