Zwick / Roell

D-K-18351-01-00 Kalibrierlaboratorium
Calibration laboratory

Inhaltsangabe Urkundenpaket Akkreditierung

Contents of accreditation certificate package

Dieses Dokument besteht aus:

1. Akkreditierungs-Urkunde
2. Anlage zur Akkreditierungs-Urkunde
3. Kalibrierverfahren im flexiblen Scope

This document consists of:

1. Accreditation Certificate
2. Annex to the Accreditation Certificate
3. Calibration procedures in the flexible scope

DAkkS
Deutsche
Akkreditierungsstelle
D-K-18351-01-00

ZwickRoell GmbH & Co. KG
August-Nagel-Straße 11, 89079 Ulm

DAkkS
Deutsche
Akkreditierungsstelle

Accreditation

The Deutsche Akkreditierungsstelle attests with this **Accreditation Certificate** that the calibration laboratory

ZwickRoell GmbH & Co. KG
August-Nagel-Straße 11, 89079 Ulm

meets the requirements according to DIN EN ISO/IEC 17025:2018 for the conformity assessment activities listed in the annex to this certificate. This includes additional existing legal and normative requirements for the calibration laboratory, including those in relevant sectoral schemes, provided they are explicitly confirmed in the annex to this certificate.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories and they conform to the principles of DIN EN ISO 9001.

This accreditation was issued in accordance with Art. 5 Para. 1 Sentence 2 of Regulation (EC) 765/2008, after an accreditation procedure was carried out in compliance with the minimum requirements of DIN EN ISO/IEC 17011 and on the basis of a review and decision of the appointed accreditation committees.

This accreditation certificate only applies in connection with the notices of 28.04.2025 with accreditation number D-K-18351-01.
It consists of this cover sheet, the reverse side of the cover sheet and the following annex with a total of 14 pages.

Registration number of the accreditation certificate: **D-K-18351-01-00**

Berlin, 28.04.2025
Dipl.-Wirtsch.-Ing. (BA) Tim Harnisch
Head of Technical Unit

Translation issued:
Dipl.-Wirtsch.-Ing. (BA) Tim Harnisch
Head of Technical Unit

The certificate together with the annex reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH (www.dakks.de).

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf

Deutsche Akkreditierungsstelle GmbH

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The Deutsche Akkreditierungsstelle GmbH (DAkkS) is the entrusted national accreditation body of the Federal Republic of Germany according to § 8 section 1 AkkStelleG in conjunction with § 1 section 1 AkkStelleGBV. DAkkS is designated as the national accreditation authority by Germany according to Art. 4 Para. 4 of Regulation (EC) 765/2008 and clause 4.7 of DIN EN ISO/IEC 17000.

Pursuant to Art. 11 section 2 of Regulation (EC) 765/2008, the accreditation certificate shall be recognised as equivalent by the national authorities within the scope of this Regulation as well as by the WTO member states that have committed themselves in bilateral or multilateral mutual agreements to recognise the certificates of accreditation bodies that are members of ILAC or IAF as equivalent.

DAkkS is a signatory to the multilateral agreements for mutual recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Co-operation (ILAC).

The up-to-date state of membership can be retrieved from the following websites:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Deutsche Akkreditierungsstelle

Annex to the Accreditation Certificate D-K-18351-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: **28.04.2025**

Date of issue: 28.04.2025

Holder of accreditation certificate:

ZwickRoell GmbH & Co. KG
August-Nagel-Straße 11, 89079 Ulm

with the locations

ZwickRoell GmbH & Co. KG
August-Nagel-Straße 11, 89079 Ulm

ZwickRoell GmbH & Co. KG
Parc Empresarial Trade Center, Avda Corts Catalanes 5-7 planta 2a Local 1,
E-08173 Sant Cugat del Valles (Barcelona), Spain

ZwickRoell GmbH & Co. KG
Via Renata Bianchi, 40 (3° piano), I-16152 Genova, Italy

ZwickRoell GmbH & Co. KG
18 Boon Lay Way, #06-105/106, TradeHub 21, Singapore 609966

The calibration laboratory meets the requirements of DIN EN ISO/IEC 17025:2018 to carry out the conformity assessment activities listed in this annex. The calibration laboratory meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories and they conform to the principles of DIN EN ISO 9001.

This certificate annex is only valid together with the written accreditation certificate and reflects the status as indicated by the date of issue. The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at https://www.dakks.de.

Calibrations in the fields:

Mechanical quantities

Material testing machines (MTM)

- **Force (MTM)** [a)]
- **Extension (MTM)** [a)]
- **Mechanical work (MTM)** [a)]
- **Hardness (MTM)** [a)]
- **Torque (MTM)** [a)]
- **Angle of rotation (MTM)** [a)]
- **Velocity (MTM)** [a)]
- **Temperature (MTM)** [a]

Thermodynamic quantities

Temperature quantities

- **Climatic chambers (temperature)** [a)]
- **Direct reading thermometers** [a)]

[a)] on site calibrations

Within the measurands / calibration items marked with [*], the calibration laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, to use calibration standards or equivalent calibration procedures listed here with different issue dates. The calibration laboratory maintains a current list of all calibration standards / equivalent calibration procedures within the flexible scope of accreditation.

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On-site calibration Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Force (MTM) *) Force measuring devices of materials testing machines according to DIN 51220	1 N to 600 kN	DIN EN ISO 7500-1:2018 with supplementary sheet 1 to 3:1999 Supplementary sheet 4:2013 DIN EN ISO 7500-2:2007 QI-D-013:2020 DIN EN ISO 6506-2:2019 DIN EN ISO 6507-2: 2018 DIN EN ISO 6508-2:2015 DIN EN ISO 4545-2: 2018 DIN EN ISO 14577-2:2015 ASTM E10:2023 ASTM E92:2023 ASTM E384:2022 ASTM E18:2022 ASTM E4:2021 ASTM E1012:2019	0,12 %	Force transducer Class 0.5 tensile / compression
	200 N to 3000 kN		0,12 %	Force transducer Class 0.5 tensile
	200 N to 5000 kN		0,12 %	Force transducer Class 0.5 compression
	0,02 N to 200 N		0,10 %	Known masses tensile / tensile and compression
Force (MTM) Contact force of falling masses of a drop weight tester	10 N to 50 kN	QI-D-012:2021	0,12 %	Force transducer Class 0.5 compression
Extension (MTM) *) Extension measuring devices of materials testing machines according to DIN 51220	0 mm to 60 mm	DIN EN ISO 9513:2013 DIN EN ISO 6508-2:2015 DIN EN ISO 14577-2:2015 DIN EN ISO 527-1:2019 ASTM E83:2023 ASTM E2309:2020	$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,5 µm	Measuring principle: incremental probe (CT6002)
	0 mm to 12 mm		$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,5 µm	Measuring principle: incremental probe (MT 1201)
	0 mm to 205 mm		$2 \cdot 10^{-3} \cdot l$; but not < 5 µm	Measuring principle: probe on basis of magnet technology
	0 mm to 1500 mm		$2 \cdot 10^{-3} \cdot l$; but not < 4 µm	Measuring principle: Rotary encoder with incremental divide
	1,1 mm to 100 mm		$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,5 µm	Gauge blocks class 1
	0 mm to 60 mm	QI-D-017 Linearity test	$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,5 µm	Measuring principle: incremental probe (CT6002)
Extension (MTM) Extension measuring devices of cross section measuring devices	1,1 mm to 100 mm	QI-D-010:2019	$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,5 µm	Gauge blocks class 1 *l:* measured length
Extension (MTM) Determination of the height of fall on a drop weight tester	10 mm to 5000 mm	QI-D-012:2021	$1{,}5 \cdot 10^{-3} \cdot l$	Measuring principle: Rotary encoder with incremental divide

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On-site calibration Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Dimensions of the impactor and sample holder on a drop weight tester	10 mm to 300 mm	QI-D-012:2021	$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,03 mm	Calipers, outside micrometers
Optical indentation measuring devices of Hardness Testers *	0 mm to 6 mm	DIN EN ISO 6506-2:2019 DIN EN ISO 6507-2:2018 DIN EN ISO 4545-2:2018 ASTM E10:2023 ASTM E92:2023 ASTM E384:2022	$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,5 µm	Measuring principle: Object micrometer in incident light *l:* measured length
Depth measuring device of Hardness Testers *	0 mm to 0,8 mm	DIN EN ISO 6508-2:2015 ASTM E18:2022	$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,5 µm	Measuring principle: incremental probe
Hardness (MTM) * Hardness Testers according to Brinell-, Vickers-, Rockwell-, Knoop- and Martens test procedure	100 HB to 550 HB	DIN EN ISO 6506-2:2019 DIN EN ISO 6507-2:2018 DIN EN ISO 6508-2:2015 DIN EN ISO 4545-2:2018 ASTM E10:2023 ASTM E92:2023 ASTM E384:2022 ASTM E18:2022	2 % HB	The values indicated for the measurement uncertainty are valid for the indirect verification with hardness comparison plates. The measurement uncertainty of the individual parameters of the direct verification is indicated separately. U_{CRM} = calibration uncertainty of the hardness comparison plate
	30 HV to 950 HV (Hardness scales HV5 to HV100) (Hardness scales HV0,01 to HV3)		1 % HV, but not < 1,5 · U_{CRM} 2 % HV, but not < 1,5 · U_{CRM}	
	100 HK to 950 HK (Hardness scales HK 0,01 to HK 2)		2 % HK, but not < 1,5 · U_{CRM}	
	20 HRA to 65 HRA		1,0 HRA	
	66 HRA to 95 HRA		0,5 HRA	
	10 HRB to 55 HRB		1,5 HRB	
	56 HRB to 100 HRB		1,0 HRB	
	20 HRC to 55 HRC		1,0 HRC	
	56 HRC to 70 HRC		0,5 HRC	
	40 HRD to 69 HRD		1,5 HRD	
	70 HRD to 77 HRD		1,0 HRD	
	60 HRF to 100 HRF		1,0 HRF	
	20 HRN to 60 HRN		1,0 HRN	
	61 HRN to 91 HRN		0,5 HRN	
	12 HRT to 93 HRT		2,0 HRT	

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On-site calibration Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Mechanical Work (MTM) * Pendulum Impact Testers and Impact Testing Devices	0,2 J to 750 J	DIN EN-ISO 148-2:2017 DIN EN ISO 13802:2016 DIN 51222:2017 DIN 53435:2018 DIN 53512:2000 ISO 4662:2017 ASTM E23:2023a	Force: 0.12 % Pendulum length: 0.17 mm Angle: 0.03° Time: 0.02 s	The measurement uncertainty is calculated for: 1. Position of centre of percussion, 2. Potential energy, 3. Error of the indicated energy.
Torque (MTM) Torque measuring devices of materials testing machines according to DIN 51220	0,2 N·m to 2000 N·m	QI-D-005: 2018	0,30 %	With torque transducers (clockwise and counterclockwise torque)
	0,02 N·m to 20 N·m		0,30 %	Known masses tensile in combination with lever arm
Angle of rotation (MTM) Measuring devices for angle of rotation on materials testing machines according to DIN 51220	1° to 360°	QI-D-006:2018	$3 \cdot 10^{-3} \cdot W$	Measuring principle: incremental W: measured angle
Velocity (MTM) Traverse speed of materials testing machines according to DIN 51220*	0,1 mm/min to 2000 mm/min	ASTM E2658:2015	0,3 %	Measuring principle: Start/Stop-Method of distance and time using an automatically controlled stopwatch and gauge blocks
	0,1 mm/min to 500 mm/min		1,0%	Measuring principle: Start/Stop-Method of distance and time using a manually controlled stopwatch
Speed measurement of drop weight tester	1 m/s to 25 m/s	QI-D-007:2021 Procedure Chapter 3	0,3 %	Clock counter and tracible measurement of the light barrier flag

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On-site calibration Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Temperature * Measuring locations in climatic chambers with air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method C Measurement in air	0,2 K	Comparison with reference thermometer
	> −40 °C to 0 °C		0,15 K	
	> 0 °C to 100 °C		0,10 K	
	> 100 °C to 150 °C		0,15 K	
	> 150 °C to 200 °C		0,25 K	
	> 200 °C to 250 °C		0,35 K	
Climate chamber with air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method A and B Measurement in air	0,5 K	Comparison with reference thermometer
	> −40 °C to 0 °C		0,4 K	
	> 0 °C to 100 °C		0,2 K	
	> 100 °C to 150 °C		0,4 K	
	> 150 °C to 200 °C		0,6 K	
	> 200 °C to 250 °C		1,7 K	
Measuring locations in climatic chambers without air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method C Measurement in air	0,5 K	Comparison with reference thermometer
	> −40 °C to 0 °C		0,4 K	
	> 0 °C to 100 °C		0,3 K	
	> 100 °C to 150 °C		0,4 K	
	> 150 °C to 200 °C		0,5 K	
	> 200 °C to 250 °C		0,8 K	
Climate chamber without air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method A and B Measurement in air	3,0 K	Comparison with reference thermometer
	> −40 °C to 0 °C		2,0 K	
	> 0 °C to 100 °C		2,2 K	
	> 100 °C to 150 °C		3,0 K	
	> 150 °C to 200 °C		3,5 K	
	> 200 °C to 250 °C		5,0 K	
Direct reading thermometers with thermocouple sensor	150 °C to 300 °C	DKD-R 5-3: 2018 in dry block calibrator	2,8 K	Comparison with reference thermometer
	> 300 °C to 600 °C		3,5 K	
	> 600 °C to 900 °C		4,3 K	
	> 900 °C to 1200 °C		5,5 K	

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On-site calibration Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Force (MTM) Devices for determining the melt mass flow rate (MFR) and the melt volume flow rate (MVR) of thermoplastics	1 N to 2500 N	QI-D-015:2020	0,12 %	Force transducer Class 0.5 compression Devices according to DIN EN ISO 1133-1:2012 DIN EN ISO 1133-2:2012 ASTM D1238:2020
Devices for determining the Vicat softening temperature (VST) and HDT heat deflection temperature	0,1 N to 50 N	QI-D-014:2020	0,1 %	Comparative measurement using class F1 weights Devices according to DIN EN ISO 306:2014 DIN EN ISO 75-1:2020
Extension (MTM) Devices for determining the melt mass flow rate (MFR) and the melt volume flow rate (MVR) of thermoplastics	0 mm to 60 mm	QI-D-015:2020	$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,5 µm	incremental probe (CT6002) Devices according to DIN EN ISO 1133-1:2012 DIN EN ISO 1133-2:2012 ASTM D1238:2020
	1,1 mm to 50 mm		$1{,}5 \cdot 10^{-3} \cdot l$; but not < 6 µm	Gauge blocks class 1 Devices according to DIN EN ISO 1133-1:2012 DIN EN ISO 1133-2:2012 ASTM D1238:2020
Devices for determining the Vicat softening temperature (VST) and HDT heat deflection temperature	0,2 mm to 50 mm	QI-D-014:2020	$1{,}5 \cdot 10^{-3} \cdot l$; but not < 6 µm	Gauge blocks class 1 Devices according to DIN EN ISO 306:2014 DIN EN ISO 75-1:2020 *l:* measured length
Temperature (MTM) * Devices for determining the melt mass flow rate (MFR) and the melt volume flow rate (MVR) of thermoplastics	100°C to 400°C	DKD-R 5-1:2018	0,25 K	Comparison with standard thermometers
Devices for determining the Vicat softening temperature (VST) and HDT heat deflection temperature	20° C to 300 °C		0,4 K	Comparative measurement in oil baths against reference thermometer

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On-site calibration

Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range		Measurement conditions / procedure	Best measurement capability	Remarks
Force (MTM) * Force measuring devices of materials testing machines according to DIN 51220	1 N to 600 kN		DIN EN ISO 7500-1:2018 with supplementary sheet 1 to 3:1999 Supplementary sheet 4:2013 DIN EN ISO 7500-2:2007 DIN EN ISO 6506-2:2019 DIN EN ISO 6507-2:2018 DIN EN ISO 6508-2:2015 DIN EN ISO 4545-2:2018 ASTM E10:2023 ASTM E92:2023 ASTM E384:2022 ASTM E18:2022 ASTM E4:2021	0,12 %	Force transducer Class 0.5 tensile / compression
	200 N to 3000 kN			0,12 %	Force transducer Class 0.5 tensile
	200 N to 5000 kN			0,12 %	Force transducer Class 0.5 compression
	0,02 N to 200 N			0,10 %	Known masses tensile / compression
Extension (MTM) * Extension measuring devices of materials testing machines according to DIN 51220	0 mm to 60 mm		DIN EN ISO 9513:2013 DIN EN ISO 6508-2:2015 DIN EN ISO 527-1:2019 ASTM E83:2023 ASTM E2309:2020	$1,5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: incremental probe (CT6002)
	0 mm to 12 mm			$1,5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: incremental probe (MT 1201)
	0 mm to 205 mm			$2 \cdot 10^{-3} \cdot l$; but not < 5 µm	Measuring principle: probe on basis of magnet technology
	0 mm to 1500 mm			$2 \cdot 10^{-3} \cdot l$; but not <4 µm	Measuring principle: Rotary encoder with incremental divide
	1,1 mm to 100 mm			$1,5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Gauge blocks class 1
Extension (MTM) Extension measuring devices of cross section measuring devices	1,1 mm to 100 mm		QI-D-010:2019	1,5 · 10-3 · l; but not < 0,5 µm	Gauge blocks class 1
Optical indentation measuring devices of Hardness Testers *	0 mm to 6 mm		DIN EN ISO 6506-2:2019 DIN EN ISO 6507-2:2018 DIN EN ISO 4545-2:2018 ASTM E10:2023 ASTM E92:2023 ASTM E384:2022	$1,5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: Object micrometer in incident light *l:* measured length
Depth measuring device of Hardness Testers*	0 mm to 0,8 mm		DIN EN ISO 6508-2:2015 ASTM E18:2022	$1,5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: incremental probe

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On-site calibration

Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Mechanical Work (MTM) * Pendulum Impact Testers and Impact Testing Devices	0,2 J to 750 J	DIN EN-ISO 148-2:2017 DIN EN ISO 13802:2016 DIN 51222:2017 DIN 53435:2018 DIN 53512:2000 ASTM E23:2023a	Kraft: 0,12 % Pendellänge: 0,17 mm Winkel: 0,03° Zeit: 0,02 s	The measurement uncertainty is calculated for: 1. Position of centre of percussion, 2. Potential energy, 3. Error of the indicated energy.
Velocity (MTM) * Traverse speed of materials testing machines according to DIN 51220	0,1 mm/min to 500 mm/min	ASTM E2658:2015	1,0 %	Measuring principle: Start/Stop-Method of distance and time using a manually controlled stopwatch
Hardness (MTM) * Hardness Testers according to Brinell-, Vickers-, Knoop-, and Rockwell test procedure	100 HB to 550 HB	DIN EN ISO 6506-2:2019 DIN EN ISO 6507-2:2018 DIN EN ISO 6508-2:2015 DIN EN ISO 4545-2:2018 ASTM E10:2023 ASTM E92:2023 ASTM E384:2022 ASTM E18:2022	2 % HB	The values indicated for the measurement uncertainty are valid for the indirect verification with hardness comparison plates. The measurement uncertainty of the individual parameters of the direct verification is indicated separately. U_{CRM} = calibration uncertainty of the hardness comparison plate
	30 HV to 950 HV (Hardness scales HV5 to HV100) (Hardness scales HV0,01 to HV3)		1 % HV, but not < 1,5 · U_{CRM} 2 % HV, but not < 1,5 · U_{CRM}	
	100 HK to 950 HK (Hardness scales HK 0,01 to HK 2)		2 % HK, but not < 1,5 · U_{CRM}	
	20 HRA to 65 HRA		1,0 HRA	
	66 HRA to 95 HRA		0,5 HRA	
	10 HRB to 55 HRB		1,5 HRB	
	56 HRB to 100 HRB		1,0 HRB	
	20 HRC to 55 HRC		1,0 HRC	
	56 HRC to 70 HRC		0,5 HRC	
	40 HRD to 69 HRD		1,5 HRD	
	70 HRD to 77 HRD		1,0 HRD	
	60 HRF to 100 HRF		1,0 HRF	
	20 HRN to 60 HRN		1,0 HRN	
	61 HRN to 91 HRN		0,5 HRN	
	12 HRT to 93 HRT		2,0 HRT	

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On-site calibration

Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Temperature * Measuring locations in climatic chambers with air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method C Measurement in air	0,25 K	Comparison with reference thermometer
	> −40 °C to 0 °C		0,25 K	
	> 0 °C to 100 °C		0,20 K	
	> 100 °C to 150 °C		0,25 K	
	> 150 °C to 200 °C		0,70 K	
	> 200 °C to 250 °C		0,70 K	
Climate chamber with air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method A and B Measurement in air	0,5 K	Comparison with reference thermometer
	> −40 °C to 0 °C		0,4 K	
	> 0 °C to 100 °C		0,2 K	
	> 100 °C to 150 °C		0,4 K	
	> 150 °C to 200 °C		0,9 K	
	> 200 °C to 250 °C		1,7 K	
Measuring locations in climatic chambers without air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method C Measurement in air	0,6 K	Comparison with reference thermometer
	> −40 °C to 0 °C		0,5 K	
	> 0 °C to 100 °C		0,6 K	
	> 100 °C to 150 °C		0,8 K	
	> 150 °C to 200 °C		1,0 K	
	> 200 °C to 250 °C		1,5 K	
Climate chamber without air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method A and B Measurement in air	3,0 K	Comparison with reference thermometer
	> −40 °C to 0 °C		2,0 K	
	> 0 °C to 100 °C		2,2 K	
	> 100 °C to 150 °C		3,0 K	
	> 150 °C to 200 °C		3,5 K	
	> 200 °C to 250 °C		5,0 K	

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On-site calibration Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Force (MTM) *) Force measuring devices of materials testing machines according to DIN 51220	1 N to 600 kN	DIN EN ISO 7500-1:2018 with supplementary sheet 1 to 3:1999 Supplementary sheet 4:2013 DIN EN ISO 7500-2:2007 ASTM E4:2021 DIN EN ISO 6506-2:2019 DIN EN ISO 6507-2:2018 DIN EN ISO 6508-2:2015 DIN EN ISO 4545-2:2018 ASTM E10:2023 ASTM E92:2023 ASTM E384:2022 ASTM E18:2022	0,12 %	Force transducer Class 0.5 tensile / compression
	200 N to 3000 kN		0,12 %	Force transducer Class 0.5 tensile
	200 N to 5000 kN		0,12 %	Force transducer Class 0.5 compression
	0,02 N to 200 N		0,10 %	Known masses tensile / compression
Extension (MTM) *) Extension measuring devices of materials testing machines according to DIN 51220	0 mm to 60 mm	DIN EN ISO 9513:2013 DIN EN ISO 6508-2:2015 DIN EN ISO 527-1:2019 ASTM E83:2023 ASTM E2309:2020	$1{,}5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: incremental probe (CT6002)
	0 mm to 12 mm		$1{,}5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: incremental probe (MT 1201)
	0 mm to 205 mm		$2 \cdot 10^{-3} \cdot l$; but not < 5 µm	Measuring principle: probe on basis of magnet technology
	0 mm to 1500 mm		$2 \cdot 10^{-3} \cdot l$; but not <4 µm	Measuring principle: Rotary encoder with incremental divide
	1,1 mm to 100 mm		$1{,}5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Gauge blocks class 1
Extension measuring devices of cross section measuring devices	1,1 mm to 100 mm	QI-D-010:2019	$1{,}5 \cdot 10^{-3} \cdot l$; but not < 0,5 µm	Gauge blocks class 1
Optical indentation measuring devices of Hardness Testers *	0 mm to 6 mm	DIN EN ISO 6506-2:2019 DIN EN ISO 6507-2:2018 DIN EN ISO 4545-2:2018 ASTM E10:2023 ASTM E92:2023 ASTM E384:2022	$1{,}5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: Object micrometer in incident light *l:* measured length
Depth measuring device of Hardness Testers *	0 mm to 0,8 mm	DIN EN ISO 6508-2:2015 ASTM E18:2022	$1{,}5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: incremental probe

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On-site calibration Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Velocity (MTM) *) Traverse speed of materials testing machines according to DIN 51220	0,1 mm/min to 2000 mm/min	ASTM E2658:2015	0,3 %	Measuring principle: Start/Stop-Method of distance and time using an automatically controlled stopwatch and gauge blocks
	0,1 mm/min to 500 mm/min		1,0%	Measuring principle: Start/Stop-Method of distance and time using a manually controlled stopwatch
Mechanical Work (MTM) * Pendulum Impact Testers and Impact Testing Devices	0,2 J to 750 J	DIN EN-ISO 148-2:2017 DIN EN ISO 13802:2016 DIN 51222:2017 DIN 53435:2018 DIN 53512:2000 ISO 4662:2017 ASTM E23:2023a	Kraft: 0,12 % Pendellänge: 0,17 mm Winkel: 0,03° Zeit: 0,02 s	The measurement uncertainty is calculated for: 1. Position of centre of percussion, 2. Potential energy, 3. Error of the indicated energy.
Hardness (MTM) * Hardness Testers according to Brinell-, Vickers-, Knoop-, and Rockwell test procedure	100 HB to 550 HB	DIN EN ISO 6506-2:2019 DIN EN ISO 6507-2:2018 DIN EN ISO 6508-2:2015 DIN EN ISO 4545-2:2018 ASTM E10:2023 ASTM E92:2023 ASTM E384:2022 ASTM E18:2022	2 % HB	The values indicated for the measurement uncertainty are valid for the indirect calibration with hardness comparison plates. The measurement uncertainty of the individual parameters of the direct calibration is indicated separately. (U_{CRM} = calibration uncertainty of the hardness comparison plate)
	30 HV to 950 HV (Hardness scales HV5 to HV100)		1 % HV, but not < 1,5 · U_{CRM}	
	(Hardness scales HV0,01 to HV3)		2 % HV, but not < 1,5 · U_{CRM}	
	100 HK to 950 HK (Hardness scales HK 0,01 to HK 2)		2 % HK, but not < 1,5 · U_{CRM}	
	20 HRA to 65 HRA		1,0 HRA	
	66 HRA to 95 HRA		0,5 HRA	
	10 HRB to 55 HRB		1,5 HRB	
	56 HRB to 100 HRB		1,0 HRB	
	20 HRC to 55 HRC		1,0 HRC	
	56 HRC to 70 HRC		0,5 HRC	
	40 HRD to 69 HRD		1,5 HRD	
	70 HRD to 77 HRD		1,0 HRD	
	60 HRF to 100 HRF		1,0 HRF	
	20 HRN to 60 HRN		1,0 HRN	
	61 HRN to 91 HRN		0,5 HRN	
	12 HRT to 93 HRT		2,0 HRT	

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On-site calibration Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Temperature * Measuring locations in climatic chambers with air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method C Measurement in air	0,2 K	Comparison with reference thermometer
	> −40 °C to 0 °C		0,15 K	
	> 0 °C to 100 °C		0,10 K	
	> 100 °C to 150 °C		0,15 K	
	> 150 °C to 200 °C		0,25 K	
	> 200 °C to 250 °C		0,35 K	
Climate chamber with air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method A and B Measurement in air	0,5 K	Comparison with reference thermometer
	> −40 °C to 0 °C		0,4 K	
	> 0 °C to 100 °C		0,2 K	
	> 100 °C to 150 °C		0,4 K	
	> 150 °C to 200 °C		0,6 K	
	> 200 °C to 250 °C		1,7 K	
Measuring locations in climatic chambers without air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method C Measurement in air	0,5 K	Comparison with reference thermometer
	> −40 °C to 0 °C		0,4 K	
	> 0 °C to 100 °C		0,3 K	
	> 100 °C to 150 °C		0,4 K	
	> 150 °C to 200 °C		0,5 K	
	> 200 °C to 250 °C		0,8 K	
Climate chamber without air circulation	−80 °C to −40 °C	DKD-R 5-7: 2018 Method A and B Measurement in air	3,0 K	Comparison with reference thermometer
	> −40 °C to 0 °C		2,0 K	
	> 0 °C to 100 °C		2,2 K	
	> 100 °C to 150 °C		3,0 K	
	> 150 °C to 200 °C		3,5 K	
	> 200 °C to 250 °C		5,0 K	
Direct reading thermometers with thermocouple sensor	150 °C to 300 °C	DKD-R 5-3: 2018 in dry block calibrator	2,8 K	Comparison with reference thermometer
	> 300 °C to 600 °C		3,5 K	
	> 600 °C to 900 °C		4,3 K	
	> 900 °C to 1200 °C		5,5 K	

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On-site calibration Calibration and measurement capabilities (CMC)

Measured quantity / Calibration item	Range	Measurement conditions / procedure	Best measurement capability	Remarks
Force (MTM) * Force measuring devices of materials testing machines according to DIN 51220	1 N to 600 kN	DIN EN ISO 7500-1:2018 with supplementary sheet 1 to 3:1999 Supplementary sheet 4:2013 DIN EN ISO 7500-2:2007 ASTM E4:2021	0,12 %	Force transducer Class 0.5 tensile / compression
	200 N to 3000 kN		0,12 %	Force transducer Class 0.5 tensile
	200 N to 5000 kN		0,12 %	Force transducer Class 0.5 compression
	0,02 N to 200 N		0,10 %	Known masses tensile / compression
Extension (MTM) * Extension measuring devices of materials testing machines according to DIN 51220	0 mm to 60 mm	DIN EN ISO 9513:2013 DIN EN ISO 527-1:2019 ASTM E83:2023 ASTM E2309:2020	$1{,}5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: incremental (CT6002)
	0 mm to 12 mm		$1{,}5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Measuring principle: incremental probe (MT 1201)
	0 mm to 205 mm		$2 \cdot 10^{-3} \cdot l$; but not < 5 µm	Measuring principle: probe on basis of magnet technology
	0 mm to 1500 mm		$2 \cdot 10^{-3} \cdot l$; but not <4 µm	Measuring principle: Rotary encoder with incremental divide
	1,1 mm to 100 mm		$1{,}5 \cdot 10^{-3} \cdot l$; but not <0,5 µm	Gauge blocks class 1 *l:* measured length
Velocity (MTM) * Traverse speed of materials testing machines according to DIN 51220	0,1 mm/min to 500 mm/min	ASTM E2658:2015	1,0 %	Measuring principle: Start/Stop-Method of distance and time using a manually controlled stopwatch

Abbreviations used:

ASTM	ASTM American Standard for Testing and Materials
DIN	Deutsches Institut für Normung e.V. (German Institut for Standardization)
EN	European Standard
ISO	International Organisation for Standardization
QI	Quality Instruction (In house calibration procedure of ZwickRoell GmbH & Co. KG)

Kalibrierverfahren im flexiblen Scope

Calibration procedures in the flexible scope

Sehr geehrte Kundin, sehr geehrter Kunde,

wir besitzen für unsere DAkkS-Akkreditierung nach DIN EN ISO/IEC 17025 eine Flexibilisierung Kategorie III. Damit dürfen die in der Anlage zur Akkreditierungsurkunde aufgeführten Normausgaben durch neuere Normausgaben ersetzt werden, ohne dass eine neue Anlage zur Urkunde ausgestellt werden muss. In der folgenden Auflistung finden Sie die Versionsstände, nach denen wir aktuell kalibrieren.

Dear customer,

We have flexibility category III for our DAkkS accreditation in accordance with DIN EN ISO/IEC 17025. This means that the standard editions listed in the annex to the accreditation certificate may be replaced by newer standard editions without the need to issue a new annex to the certificate. The following list shows the versions we currently use for calibration.

Messgröße Measurand	Version Version	Kurzbezeichnung DE Short name DE	Kurzbezeichnung EN Short name EN	Bereich Range	Kleinste Messunsicherheit Minimum Measurement uncertainty
MPM Kraft / MTM Force					
DIN EN ISO 7500-1	2018-06	Kalibrierung Kraft	Calibration of force	0,02 N – 200 N	0,10 % mit Belastungskörpern/with dead weights
Beiblatt 1 zu DIN EN ISO 7500-1	2022-06	Beiblatt Zug/Druck/Biege	Supplement Tensile/Compr./Bending	1 N – 3000 kN	0,12 % mit Kraftaufnehmern in Zugrichtung/with load cells in tensile direction
Beiblatt 2 zu DIN EN ISO 7500-1	2022-06	Beiblatt Federprüfmasch.	Supplement Springtesting	1 N – 5000 kN	0,12 % mit Kraftaufnehmern in Druckrichtung/with load cells in compression direction
Beiblatt 3 zu DIN EN ISO 7500-1	1999-11	Beiblatt Schwingprüfmasch.	Supplement Dynamictesting		
Beiblatt 4 zu DIN EN ISO 7500-1	2013-03	Beiblatt Messunsicherheit	Supplement uncertainty		
DIN EN ISO 7500-2	2007-04	Zeitstandsanlagen	Creep Testing machines		
ASTM E4	2024	Kalibrierung Kraft	Calibration of force		
ASTM E1012	2019	Überprüfung der Ausrichtung	Verification of Alignment		

Hinweis: Die Klassifizierung berücksichtigt die erweiterte Messunsicherheit nach DIN EN ISO 7500-1 Beiblatt 4:2013-03.
Note: The classification considers the expanded measurement uncertainty according DIN EN ISO 7500-1 Suppl. 4:2013-03.

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Kalibrierverfahren im flexiblen Scope

Calibration procedures in the flexible scope

Messgröße Measurand	Version Version	Kurzbezeichnung DE Short name DE	Kurzbezeichnung EN Short name EN	Bereich Range	Kleinste Messunsicherheit Minimum Measurement uncertainty
MPM Länge / MTM Length					
DIN EN ISO 9513	2013-05	Kalibrierung Länge	Calibration length	0 mm – 60 mm	0,15 % / jedoch mind./but min. 0,5 µm mit inkrementellem Messtaster/with incremental measuring transducer
DIN EN ISO 527-1	2019-12	Kunststoffe, Zusatzanforderung zu DIN EN ISO 9513	Plastics, additional requirements to DIN EN ISO 9513		
ASTM E83	2023	Kalibrierung Länge mit *L*e	Calibration length w/ *L*e	0 mm – 205 mm	0,20 % / jedoch mind./but min. 5 µm mit Messtaster Magnettechnologie/with measuring transducer magnetic technology
ASTM E2309/E2309M	2020	Kalibrierung Länge ohne *L*e	Calibration length w/o *L*e	0 mm – 1500 mm	0,20 % / jedoch mind./but min. 4 µm mit Seilzugaufnehmer/with rope transducer
				1,1 mm – 100 mm	mit Endmaßen/with gauge blocks

Hinweis: Die Klassifizierung berücksichtigt die erweiterte Messunsicherheit nach DIN EN ISO 9513:2013-05 Anhang A.
Note: The classification considers the expanded measurement uncertainty according annex A of DIN EN ISO 9513:2013-05.

MPM Geschwindigkeit / MTM speed					
ASTM E2658	2015	Kalibrierung Traversengeschwindigkeit	calibration crosshead speed	0,1 mm/min – 2000 mm/min 0,1 mm/min – 500 mm/min	0,3 % 1,0 %

Hinweis: Die Klassifizierung berücksichtigt die Grenzwerte für die erweiterte Messunsicherheit.
Note: The classification considers the limit values expanded measurement uncertainty.

PSW / Pendulum					
DIN EN ISO 148-2	2017-05	Metalle, Charpy über 150 J	Metals, Charpy above 150 J	0,5 J – 750 J	0,12 % für die Kraft/for the force 0,17 mm für die Pendellänge/for the pendulum length 0,03° für den Winkel/for the angle 0,02 s für die Zeit/for the time
ASTM E23	2025	Metalle, Charpy über 150 J	Metals, Charpy above 150 J		
DIN 51222	2017-02	Metals, Charpy bis 50 J	Metals, Charpy up to 50 J		
DIN EN ISO 13802	2016-07	Kunststoffe alle Verfahren	Plastics all methods		
DIN 53435	2018-09	Dynstat	Dynstat		
DIN 53512	2000-04	Rückprall	Rebound		
ISO 4662	2017-06	Rückprall	Rebound		

Hinweis: Die Messunsicherheit wird für die Konformitätsaussage nicht berücksichtigt.
Note: The measurement uncertainty is not considered for the conformity statement.

Kalibrierverfahren im flexiblen Scope

Calibration procedures in the flexible scope

Messgröße Measurand	Version Version	Kurzbezeichnung DE Short name DE	Kurzbezeichnung EN Short name EN	Bereich Range	Kleinste Messunsicherheit Minimum Measurement uncertainty
HPM / Hardness					
DIN EN ISO 6506-2	2019-03	Brinell Kalibrierung	Brinell Calibration	Laststufen / test loads 0,01 kg – 3000 kg	0,12% für die Prüfkraft / for the test loads
DIN EN ISO 6507-2	2018-07	Vickers Kalibrierung	Vickers Calibration		
DIN EN ISO 6508-2	2024-04	Rockwell Kalibrierung	Rockwell Calibration	Optisches Eindring-Messsystem / Optical indentation measuring system 0 mm – 6 mm Tiefenmesssystem / Depth measuring system 0 mm – 0,8 mm	0,15 % / jedoch mind./but min. 0,5 µm für die Eindring-Messsyteme / for the indentation measuring devices
DIN EN ISO 4545-2	2018-07	Knoop Kalibrierung	Knoop Calibration		
DIN EN ISO 14577-2	2015-11	Universalhärte Kalibrierung	Universal hardn. Calibration		
ASTM E10	2023	Brinell	Brinell		
ASTM E92	2023	Vickers und Knoop	Vickers und Knoop		
ASTM E384	2022	Mikrovickers und -Knoop	Mikrovickers and -Knoop		
ASTM E18	2025	Rockwell	Rockwell		
				Indirekte Kalibrierung / indirect calibration:	Für alle Verfahren: jedoch nicht weniger als die 1,5-fache Messunsicherheit der verwendeten HVPL For all methods: but not less than the 1.5-fold of the used hardness test block
				HB	2 %
				HK0,01 – HK2 / HV0,01 – HV3	2 %
				HV5 – HV100	1 %
				HRx	0,5 – 2,0

Hinweis: Die Messunsicherheit wird für die Konformitätsaussage nicht berücksichtigt.
Note: The measurement uncertainty is not considered for the conformity statement.

Kalibrierverfahren im flexiblen Scope

Calibration procedures in the flexible scope

Messgröße Measurand	Version Version	Kurzbezeichnung DE Short name DE	Kurzbezeichnung EN Short name EN	Bereich Range	Kleinste Messunsicherheit Minimum Measurement uncertainty
Temperatur / Temperature					
DKD-R 5-7	2025-01	Messorte in Temperaturschränken nach Methode C	Measuring locations of temperature chambers according method C	-80 °C – -40 °C	0,2 K
				> -40 °C – 150 °C	0,15 K
				> 150 °C – 200 °C	0,25 K
				> 200 °C – 250 °C	0,5 K
		Temperaturschränke Methode A und B	Temperature chambers Method A and B	-80 °C – -40 °C	0,5 K
				> -40 °C – 150 °C	0,4 K
				> 150 °C – 200 °C	0,8 K
				> 200 °C – 250 °C	2,0 K
DKD-R 5-3	2018-09	Thermoelemente	thermo couples	150 °C – 300 °C	2,8 K
				> 300 °C – 600 °C	3,5 K
				> 600 °C – 900 °C	4,3 K
				> 900 °C – 1200 °C	5,5 K
DKD-R 5-1	2023-11	Fließprüfgeräte, Kalibrierung Temperatur	Meltflow devices, calibration of temperature	100 °C – 400 °C	0,25 K
		HDT und Vicat Geräte, Kalibrierung der Temperatursensoren	HDT and Vicat devices, calibration of temperature sensors	20 °C – 300 °C	0,4 K

Hinweis: Die Messunsicherheit wird für die Konformitätsaussage nicht berücksichtigt.
Note: The measurement uncertainty is not considered for the conformity statement.

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