

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



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

Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Europa-Allee 52
60327 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

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>.

Annex to the Accreditation Certificate D-K-18351-01-00

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.

Valid from: 28.04.2025

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

Annex to the Accreditation Certificate D-K-18351-01-00

August-Nagel-Straße 11, 89079 Ulm

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 | 0,12 % | Force transducer Class 0.5 tensile / compression |
| | 200 N to 3000 kN | DIN EN ISO 7500-2:2007 QI-D-013:2020 DIN EN ISO 6506-2:2019 | 0,12 % | Force transducer Class 0.5 tensile |
| | 200 N to 5000 kN | DIN EN ISO 6507-2: 2018 DIN EN ISO 6508-2:2015 DIN EN ISO 4545-2: 2018 DIN EN ISO 14577-2:2015 | 0,12 % | Force transducer Class 0.5 compression |
| | 0,02 N to 200 N | ASTM E10:2023 ASTM E92:2023 ASTM E384:2022 ASTM E18:2022 ASTM E4:2021 ASTM E1012:2019 | 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 | $1,5 \cdot 10^{-3} \cdot l$; but not < 0,5 μm | Measuring principle: incremental probe (CT6002) |
| | 0 mm to 12 mm | 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 (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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August-Nagel-Straße 11, 89079 Ulm

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 | QJ-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 $< 0,5 \mu\text{m}$ | 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 $< 0,5 \mu\text{m}$ | Measuring principle: incremental probe |
| Hardness (MTM) * Hardness Testers according to Brinell-, Vickers-, Rockwell-, Knoop- and Martens test procedure | 100 HB to 550 HB 30 HV to 950 HV (Hardness scales HV5 to HV100) (Hardness scales HV0,01 to HV3) 100 HK to 950 HK (Hardness scales HK 0,01 to HK 2) 20 HRA to 65 HRA 66 HRA to 95 HRA 10 HRB to 55 HRB 56 HRB to 100 HRB 20 HRC to 55 HRC 56 HRC to 70 HRC 40 HRD to 69 HRD 70 HRD to 77 HRD 60 HRF to 100 HRF 20 HRN to 60 HRN 61 HRN to 91 HRN 12 HRT to 93 HRT | 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 1% HV, but not $< 1,5 \cdot U_{\text{CRM}}$ 2% HV, but not $< 1,5 \cdot U_{\text{CRM}}$ 2% HK, but not $< 1,5 \cdot U_{\text{CRM}}$ 1,0 HRA 0,5 HRA 1,5 HRB 1,0 HRB 1,0 HRC 0,5 HRC 1,5 HRD 1,0 HRD 1,0 HRF 1,0 HRN 0,5 HRN 2,0 HRT | 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 |

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August-Nagel-Straße 11, 89079 Ulm

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 traceable measurement of the light barrier flag |

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August-Nagel-Straße 11, 89079 Ulm

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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August-Nagel-Straße 11, 89079 Ulm
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 $< 0,5 \mu\text{m}$ | 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 $< 6 \mu\text{m}$ | 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 $< 6 \mu\text{m}$ | Gauge blocks class 1 Devices according to DIN EN ISO 306:2014 DIN EN ISO 75-1:2020 <i>l</i> : 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 |
| | 20° C to 300 °C | | 0,4 K | Comparative measurement in oil baths against reference thermometer |

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Annex to the Accreditation Certificate D-K-18351-01-00

**Parc Empresarial Trade Center,
Avda Corts Catalanes 5-7 planta 2^a Local 1, E-08173 Sant Cugat del Valles (Barcelona), Spanien**

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 $<0,5 \mu\text{m}$ | Measuring principle: incremental probe (CT6002) |
| | 0 mm to 12 mm | | $1,5 \cdot 10^{-3} \cdot l$; but not $<0,5 \mu\text{m}$ | Measuring principle: incremental probe (MT 1201) |
| | 0 mm to 205 mm | | $2 \cdot 10^{-3} \cdot l$; but not $< 5 \mu\text{m}$ | Measuring principle: probe on basis of magnet technology |
| | 0 mm to 1500 mm | | $2 \cdot 10^{-3} \cdot l$; but not $<4 \mu\text{m}$ | Measuring principle: Rotary encoder with incremental divide |
| | 1,1 mm to 100 mm | | $1,5 \cdot 10^{-3} \cdot l$; but not $<0,5 \mu\text{m}$ | Gauge blocks class 1 |
| Extension (MTM) Extension measuring devices of cross section measuring devices | 1,1 mm to 100 mm | QI-D-010:2019 | $1,5 \cdot 10^{-3} \cdot l$; but not $< 0,5 \mu\text{m}$ | 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 $<0,5 \mu\text{m}$ | Measuring principle: Object micrometer in incident light /: 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 $<0,5 \mu\text{m}$ | Measuring principle: incremental probe |

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Annex to the Accreditation Certificate D-K-18351-01-00

**Parc Empresarial Trade Center,
Avda Corts Catalanes 5-7 planta 2^a Local 1, E-08173 Sant Cugat del Valles (Barcelona), Spanien**

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 < $1,5 \cdot U_{CRM}$ 2 % HV, but not < $1,5 \cdot U_{CRM}$ | |
| | 100 HK to 950 HK (Hardness scales HK 0,01 to HK 2) | | 2 % HK, but not < $1,5 \cdot U_{CRM}$ | |
| | 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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Annex to the Accreditation Certificate D-K-18351-01-00

**Parc Empresarial Trade Center,
Avda Corts Catalanes 5-7 planta 2ª Local 1, E-08173 Santa Cugat del Valles (Barcelona), Spanien**

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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Annex to the Accreditation Certificate D-K-18351-01-00

Via Renata Bianchi, 40 (3° piano), I-16152 Genova, Italien

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 | 0,12 % | Force transducer Class 0.5 tensile / compression |
| | 200 N to 3000 kN | Supplementary sheet 4:2013 | 0,12 % | Force transducer Class 0.5 tensile |
| | 200 N to 5000 kN | DIN EN ISO 7500-2:2007 ASTM E4:2021 | 0,12 % | Force transducer Class 0.5 compression |
| | 0,02 N to 200 N | 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 | 0,10 % | 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 | $1,5 \cdot 10^{-3} \cdot l$; but not $< 0,5 \mu\text{m}$ | Measuring principle: incremental probe (CT6002) |
| | 0 mm to 12 mm | ASTM E83:2023 ASTM E2309:2020 | $1,5 \cdot 10^{-3} \cdot l$; but not $< 0,5 \mu\text{m}$ | Measuring principle: incremental probe (MT 1201) |
| | 0 mm to 205 mm | | $2 \cdot 10^{-3} \cdot l$; but not $< 5 \mu\text{m}$ | Measuring principle: probe on basis of magnet technology |
| | 0 mm to 1500 mm | | $2 \cdot 10^{-3} \cdot l$; but not $< 4 \mu\text{m}$ | Measuring principle: Rotary encoder with incremental divide |
| | 1,1 mm to 100 mm | | $1,5 \cdot 10^{-3} \cdot l$; but not $< 0,5 \mu\text{m}$ | 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 $< 0,5 \mu\text{m}$ | 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 $< 0,5 \mu\text{m}$ | Measuring principle: Object micrometer in incident light <i>l</i> : 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 $< 0,5 \mu\text{m}$ | Measuring principle: incremental probe |

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Annex to the Accreditation Certificate D-K-18351-01-00

Via Renata Bianchi, 40 (3° piano), I-16152 Genova, Italien

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) (Hardness scales HV0,01 to HV3) | | 1 % HV, but not < $1,5 \cdot U_{CRM}$ 2 % HV, but not < $1,5 \cdot U_{CRM}$ | |
| | 100 HK to 950 HK (Hardness scales HK 0,01 to HK 2) | | 2 % HK, but not < $1,5 \cdot U_{CRM}$ | |
| | 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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Annex to the Accreditation Certificate D-K-18351-01-00

Via Renata Bianchi, 40 (3° piano), I-16152 Genova, Italien

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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Annex to the Accreditation Certificate D-K-18351-01-00
18 Boon Lay Way, #06-105/106, TradeHub 21, Singapore 609966
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 $<0,5 \mu\text{m}$ | Measuring principle: incremental (CT6002) |
| | 0 mm to 12 mm | | $1,5 \cdot 10^{-3} \cdot l$; but not $<0,5 \mu\text{m}$ | Measuring principle: incremental probe (MT 1201) |
| | 0 mm to 205 mm | | $2 \cdot 10^{-3} \cdot l$; but not $< 5 \mu\text{m}$ | Measuring principle: probe on basis of magnet technology |
| | 0 mm to 1500 mm | | $2 \cdot 10^{-3} \cdot l$; but not $<4 \mu\text{m}$ | Measuring principle: Rotary encoder with incremental divide |
| | 1,1 mm to 100 mm | | $1,5 \cdot 10^{-3} \cdot l$; but not $<0,5 \mu\text{m}$ | 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) |

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

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 Ten- sile/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 | |
| Beiblatt 3 zu DIN EN ISO 7500-1 | 1999-11 | Beiblatt Schwingprüfmasch. | Supplement Dynamictesting | | 0,12 % mit Kraftaufnehmern in Druckrichtung/with load cells in compression direction |
| 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.

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 | 0 mm – 205 mm | 0,20 % / jedoch mind./but min. 5 µm mit Messtaster Magnettechnologie/with measuring transducer magnetic technology |
| ASTM E83 | 2025 | Kalibrierung Länge mit Le | Calibration length w/ Le | 0 mm – 1500 mm | 0,20 % / jedoch mind./but min. 4 µm mit Seilzugaufnehmer/with rope transducer |
| ASTM E2309/E2309M | 2020 | Kalibrierung Länge ohne Le | Calibration length w/o Le | 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 | | |
| DIN EN ISO 4545-2 | 2018-07 | Knoop Kalibrierung | Knoop Calibration | Optisches Eindring-Messsystem / Optical indentation measuring system | 0,15 % / jedoch mind./but min. 0,5 µm für die Eindring-Messsysteme / for the indentation measuring devices |
| DIN EN ISO 14577-2 | 2015-11 | Universalhärte Kalibrierung | Universal hardn. Calibration | | |
| ASTM E10 | 2023 | Brinell | Brinell | 0 mm – 6 mm | |
| ASTM E92 | 2023 | Vickers und Knoop | Vickers und Knoop | Tiefenmesssystem / Depth measuring system | |
| ASTM E384 | 2022 | Mikrovickers und -Knoop | Mikrovickers and -Knoop | 0 mm – 0,8 mm | |
| ASTM E18 | 2025 | Rockwell | Rockwell | | |
| | | | | Indirekte Kalibrierung / indirect calibration: | |
| | | | | HB | 2 % |
| | | | | HK0,01 – HK2 / HV0,01 – HV3 | 2 % |
| | | | | HV5 – HV100 | 1 % |
| | | | | HRx | 0,5 – 2,0 |
| | | | | | Für alle Verfahren: jedoch nicht we- niger als die 1,5-fache Messunsich- erheit der verwendeten HVPL For all methods: but not less than the 1.5-fold of the used hardness test block |

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 |
| | | Temperaturschränke Methode A und B | Temperature chambers Method A and B | > -40 °C – 150 °C > 150 °C – 200 °C > 200 °C – 250 °C -80 °C – -40 °C > -40 °C – 150 °C > 150 °C – 200 °C > 200 °C – 250 °C | 0,15 K 0,25 K 0,5 K 0,5 K 0,4 K 0,8 K 2,0 K |
| DKD-R 5-3 | 2018-09 | Thermoelemente | thermo couples | 150 °C – 300 °C > 300 °C – 600 °C > 600 °C – 900 °C > 900 °C – 1200 °C | 2,8 K 3,5 K 4,3 K 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.