

# Deutsche Akkreditierungsstelle GmbH

## Annex to the Accreditation Certificate D-K-15206-01-00 according to DIN EN ISO/IEC 17025:2018

**Valid from: 25.03.2020**

Date of issue: 25.03.2020

Holder of certificate:

**Bareiss Prüfgerätebau GmbH**  
**Breiteweg 1, 89610 Oberdischingen**

Calibration in the fields:

### **Mechanical quantities**

- **Hardness** <sup>a)</sup>
- **Material testing machines (MTM)**
- **Hardness (MTM)** <sup>a)</sup>
- **Extension (MTM)** <sup>b)</sup>
- **Mechanical work (MTM)** <sup>b)</sup>

<sup>a)</sup> also on-site calibrations

<sup>b)</sup> only on-site calibrations

Within the measurands/calibration items marked with 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.

Abbreviations used: see last page

*The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.*  
<https://www.dakks.de/en/content/accredited-bodies-dakks>

Annex to the accreditation certificate D-K-15206-01-00

Permanent Laboratory and On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
<b>Hardness (MTM)</b>				
Measuring devices for the hardness scale Shore A	0 Shore to 100 Shore	ISO 48-4:2018 * DIN ISO 7619-1:2012 * DIN EN ISO 868:2003 * ISO 48-9:2018 * DIN ISO 18898:2017 *	1.0 Shore	direct measurement with reference standards for distance and force
Analog Display				
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 mN to 8050 mN		6 mN	
Digital Display				
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 mN to 8050 mN		3 mN	
Indenter				
Shaft diameter	1.10 mm to 1.40 mm		3 µm	
Diameter of truncated cone	0.78 mm to 0.80 mm		3 µm	
Taper angle	34.75° to 35.25°		0.035°	
Pressure plate				
Outer diameter	17.50 mm to 18.50 mm		0.05 mm	
Bore diameter	2.90 mm to 3.10 mm		0.01 mm	
Measuring devices for the hardness scale Shore D	10 Shore to 100 Shore		1.0 Shore	
Analog Display				
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 mN to 44500 mN		8 mN	
Digital Display				
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 mN to 44500 mN		3 mN	
Indenter				
Shaft diameter	1.10 mm to 1.40 mm		3 µm	
Tip radius	0.09 mm to 0.11 mm		4 µm	
Taper angle	29.75° to 30.25°		0.035°	
Pressure plate				
Outer diameter	17.50 mm to 18.50 mm		0.05 mm	
Bore diameter	2.90 mm to 3.10 mm		0.01 mm	
Measuring devices for the hardness scale Micro Shore A (M Shore A)	0 Shore to 100 Shore	QMV7.2-1.1 Edition 05/2019	1.0 Shore	
Measuring distance	0.05 mm to 0.90 mm		2 µm	
Pre-load	7.8 mN to 8.8 mN		0.2 mN	
Test force	107 mN to 110 mN		0.2 mN	
Contact pressure	205 mN to 265 mN		4 mN	
Indenter				
Shaft diameter	1.10 mm to 1.40 mm		3 µm	
Tip radius	0.09 mm to 0.11 mm		4 µm	
Taper angle	29.75° to 30.25°		0.035°	
Pressure plate				
Outer diameter	5.50 mm to 6.50 mm		0.05 mm	
Bore diameter	2.90 mm to 3.10 mm		0.01 mm	

<sup>1)</sup> The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 95 % and have a coverage factor of  $k = 2$  unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
<b>Hardness (MTM)</b>				
Measuring devices for the hardness scale Micro Shore D (M Shore D)	30 Shore to 100 Shore	QMV7.2-1.1 Edition 05/2019	1.0 Shore	direct measurement with reference standards for distance and force
Measuring distance	0 mm to 0.50 mm		2 µm	
Spring force	0 mN to 9420 mN		8 mN	
Indenter				
Shaft diameter	1.10 mm to 1.40 mm		3 µm	
Tip radius	0.09 mm to 0.11 mm		4 µm	
Taper angle	29.75° to 30.25°		0.035°	
Pressure plate				
Circle segment diameter	6.00 mm to 7.00 mm		0.05 mm	
Circle segment width	3.90 mm to 4.90 mm		0.05 mm	
Bore diameter	2.90 mm to 3.10 mm		0.01 mm	
Measuring devices for the hardness scale 0 – 2 N	0 N to 2.0 N	QMV7.2-1.1 Edition 05/2019	0.02 N	
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 N to 2.03 N		4 mN	
Indenter				
Cylinder diameter	3.55 mm to 3.59 mm		2 µm	
Measuring devices for the hardness scale 0 – 20 N	0 N to 20.1 N	QMV7.2-1.1 Edition 05/2019	0.2 N	
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 N to 20.0 N		6 mN	
Indenter				
Cylinder diameter	9.98 mm to 10.02 mm		2 µm	
Measuring devices for the hardness scale IRHD N (normal)	30 IRHD to 100 IRHD	ISO 48-2:2018 * ISO 48-9:2018 * DIN ISO 18898:2017 * ASTM D 1415:2018 *	1.0 IRHD	
Measuring distance	0 mm to 1.81 mm		2 µm	
Pre-load	0.28 N to 0.32 N		1 mN	
Main force	5.39 N to 5.41 N		2 mN	
Total force	5.67 N to 5.73 N		2 mN	
Contact pressure	6.80 N to 9.80 N		10 mN	
Indenter				
Ball diameter	2.49 mm to 2.51 mm		2 µm	
Pressure plate				
Outer diameter	19.00 mm to 21.00 mm		0.05 mm	
Bore diameter	5.00 mm to 7.00 mm		0.05 mm	
Measuring devices for the hardness scale IRHD L (low)	9.9 IRHD to 34.9 IRHD	ISO 48-2:2018 * DIN ISO 18898:2017 * ISO 48-9:2018 * ASTM D 1415:2018 *	1.0 IRHD	
Measuring distance	1.09 mm to 3.19 mm		2 µm	
Pre-load	0.28 N to 0.32 N		1 mN	
Main force	5.39 N to 5.41 N		2 mN	
Total force	5.67 N to 5.73 N		2 mN	
Contact pressure	6.80 N to 9.80 N		10 mN	
Indenter				
Ball diameter	4.99 mm to 5.01 mm		2 µm	
Pressure plate				
Outer diameter	21.00 mm to 23.00 mm		0.05 mm	
Bore diameter	9.00 mm to 11.00 mm		0.05 mm	

<sup>1)</sup> The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 95 % and have a coverage factor of  $k = 2$  unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

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Permanent Laboratory and On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
<b>Hardness (MTM)</b> Measuring devices for the hardness scale IRHD M (micro)	30 IRHD to 100 IRHD	ISO 48-2:2018 * DIN ISO 18898:2017 * ISO 48-9:2018 * ASTM D 1415:2018 *	1.0 IRHD	direct measurement with reference standards for distance and force
Measuring distance	0 mm to 0.302 mm		1 µm	
Pre-load	7.8 mN to 8.8 mN		0.2 mN	
Main force	144.5 mN to 145.5 mN		0.3 mN	
Total force	152.3 mN to 154.3 mN		0.2 mN	
Contact pressure	205 mN to 265 mN		4 mN	
Indenter				
Ball diameter	0.390 mm to 0.400 mm		1 µm	
Pressure plate				
Outer diameter	3.20 mm to 3.50 mm		0.05 mm	
Bore diameter	0.85 mm to 1.15 mm		0.01 mm	
Measuring devices for the hardness scale IRHD H (hard)	30 IRHD to 100 IRHD		1.0 IRHD	
Measuring distance	0 mm to 0.45 mm		2 µm	
Pre-load	0.28 N to 0.32 N		1 mN	
Main force	5.39 N to 5.41 N		2 mN	
Total force	5.67 N to 5.73 N		2 mN	
Contact pressure	6.8 N to 9.8 N		10 mN	
Indenter				
Ball diameter	0.99 mm to 1.01 mm		2 µm	
Pressure plate				
Outer diameter	19.0 mm to 21.0 mm		0.05 mm	
Bore diameter	5.0 mm to 7.0 mm		0.05 mm	
Spring force-check device with sliding weights	0 Shore to 100 Shore	QM7.2-1.1 Edition 05/2019	0.2 Shore	direct measurement with reference standards for force
Shore A test force	0 mN to 8050 mN		1 mN	
Shore D test force	0 mN to 44500 mN		2 mN	
<b>Extension (MTM)</b> Measuring distance-control rings		QM7.2-1.1 Edition 05/2019		direct measurement with reference standards for distance
„20 Shore“	1.995 mm to 2.005 mm		0.2 Shore	
„40 Shore“	1.495 mm to 1.505 mm		1.3 µm	
„60 Shore“	0.995 mm to 1.005 mm			
„80 Shore“	0.495 mm to 0.505 mm			
<b>Hardness (MTM)</b> Measuring devices for the hardness scale Shore AM/M	0 Shore to 100 Shore	ISO 48-4:2018 * DIN ISO 7619-1:2012 * ASTM D 2240:2015 * ISO 48-9:2018 * DIN ISO 18898: 2017 *	1.0 Shore	direct measurement with reference standards for distance and force
Measuring distance	0 mm to 1.25 mm		2 µm	
Spring force	755.2 mN to 772.8 mN		2 mN	
Indenter				
Shaft diameter	0.765 mm to 0.815 mm		3 µm	
Tip radius	0.09 mm to 0.11 mm		3 µm	
Taper angle	29.75° to 30.25°		0.035°	
Pressure plate Shore AM				
Outer diameter	8.70 mm to 9.30 mm		0.05 mm	
Bore diameter	1.16 mm to 1.22 mm		0.01 mm	
Pressure plate Shore M				
Outer diameter	3.2 mm to 3.80 mm		0.05 mm	
Bore diameter	1.16 mm to 1.22 mm		0.01 mm	

<sup>1)</sup> The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 95 % and have a coverage factor of  $k = 2$  unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

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Permanent Laboratory and On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
<b>Hardness (MTM)</b>				
Measuring devices for the hardness scale Shore A0	0 Shore to 100 Shore	ISO 48-4:2018 * DIN ISO 7619-1:2012 *	1.0 Shore	direct measurement with reference standards for distance and force
Measuring distance	0 mm to 2.50 mm	ISO 48-9:2018 * DIN ISO 18898:2017 *	2 µm	
Spring force	0 mN to 8050 mN		2 mN	
Indenter				
Ball diameter	4.96 mm to 5.04 mm		2 µm	
Pressure plate				
Pressure plate surface	≥ 500 mm <sup>2</sup>		5 mm <sup>2</sup>	
Bore diameter	5.20 mm to 5.60 mm		0.05 mm	
Measuring devices for the hardness scale Shore 00	0 Shore to 100 Shore	ASTM D 2240:2015 *	1.0 Shore	
Analog display				
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 N to 1.111 N		2 mN	
Digital display				
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 N to 1.111 N		2 mN	
Indenter				
Ball diameter	2.30 mm to 2.46 mm		2 µm	
Pressure plate				
Pressure plate surface	≥ 500 mm <sup>2</sup>		5 mm <sup>2</sup>	
Bore diameter	3.40 mm to 3.80 mm		0.05 mm	
Measuring devices for the Hardness scale Shore 000	0 Shore to 100 Shore	ASTM D 2240:2015 *	1.0 Shore	
Analog/digital display				
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 N to 1.111 N		2 mN	
Indenter				
Ball radius	6.32 mm to 6.38 mm		2 µm	
Pressure plate				
Pressure plate surface	≥ 500 mm <sup>2</sup>		5 mm <sup>2</sup>	
Bore diameter	11.67 mm to 11.93 mm		0.05 mm	
Measuring devices for the Hardness scale Shore E	0 Shore to 100 Shore		1.0 Shore	
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 mN to 8050 mN		2 mN	
Indenter				
Ball diameter	4.92 mm to 5.08 mm		2 µm	
Pressure plate				
Pressure plate surface	≥ 500 mm <sup>2</sup>		5 mm <sup>2</sup>	
Bore diameter	5.80 mm to 6.20 mm		0.05 mm	

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Permanent Laboratory and On-site Calibration

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
<b>Hardness (MTM)</b>	0 Hardness-units to 100 Hardness-units	ASTM D 2240:2015 *	1.0 hardness-units	direct measurement with reference standards for distance and force
Measuring device for the Hardness scale Hardness L and L/c				
Measuring distance	0 mm to 2.50 mm		2 µm	
Spring force	0 mN to 8050 mN		2 mN	
Indenter				
Ball diameter	4.92 mm to 5.08 mm		2 µm	
Pressure plate				
Outer diameter	17.50 mm to 18.50 mm	0.05 mm		
Bore diameter	5.80 mm to 6.20 mm	0.05 mm		
Measuring device for the Hardness scale VLRH	0 VLRH to 100 VLRH	ISO 48-3:2018 * DIN ISO 27588:2014 *	1.0 VLRH	
Measuring distance	0 mm to 1.01 mm		2 µm	
Pre-load	7.8 mN to 8.8 mN		0.2 mN	
Main force	91.2 mN to 92.2 mN		0.2 mN	
Total force	99.0 mN to 101.0 mN		0.2 mN	
Contact pressure	205 mN to 265 mN		2 mN	
Indenter				
Ball diameter	2.49 mm to 2.51 mm		2 µm	
Pressure plate				
Outer diameter	5.50 mm to 6.50 mm	0.05 mm		
Bore diameter	2.90 mm to 3.10 mm	0.01 mm		
Measuring device for the Hardness scale Pusey & Jones	0 to 300 PJ	ISO 48-8:2018 * ISO 7267-3:2011 * ASTM D 531:2015 *	1.0 Pusey & Jones (PJ)	
Measuring distance	0 mm to 3.00 mm		2 µm	
Total force	9787 mN to 9826 mN		2.9 mN	
Indenter				
Ball diameter	3.16 mm to 3.19 mm	2 µm		
Measuring device for the Hardness scale Barcol	0 to 100 Barcol	ASTM D 2583a:2013 * DIN EN 59:2016 *	1.0 Barcol	
Measuring distance	0.74 mm to 0.78 mm		2 µm	
Spring force	60.8 N to 71.6 N		0.07 N	
Indenter				
Diameter of the truncated cone	0.137 mm to 0.177 mm		2 µm	
Taper angle	25.75° to 26.25°	0.035°		

<sup>1)</sup> The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 95 % and have a coverage factor of  $k = 2$  unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

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**Only Permanent Laboratory**
**Calibration and Measurement Capabilities (CMC)**

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
<b>Hardness</b> Calibration of standard rubber blocks		ISO 48-4:2018 * DIN ISO 7619-1:2012 * DIN EN ISO 868:2003 *		direct measurement with reference standards for hardness
Shore A/D	20 Shore to 90 Shore		2.0 Shore	
Shore AM/M	20 Shore to 90 Shore	ISO 48-4:2018 * DIN ISO 7619-1:2012 * ASTM D 2240:2015 *	2.0 Shore	
Shore A0	20 Shore to 90 Shore	ISO 48-4:2018 * DIN ISO 7619-1:2012 *	2.0 Shore	
Shore 00/000/E	20 Shore to 90 Shore	ASTM D 2240:2015 *	2.0 Shore	
Hardness L	20 Hardness <sub>L</sub> to 90 Hardness <sub>L</sub>	ASTM D 2240:2015 *	2.0 hardness-units	
Hardness L/c	20 Hardness <sub>L/c</sub> to 90 Hardness <sub>L/c</sub>			
IRHD M (micro)	30 IRHD to 90 IRHD	ISO 48-2:2018 *	2.0 IRHD	
IRHD N (normal)	30 IRHD to 90 IRHD			
IRHD L (low)	10 IRHD to 34.9 IRHD			
IRHD H (hard)	85 IRHD to 100 IRHD			
VLRH	20 VLRH to 90 VLRH	ISO 48-3:2018 * DIN ISO 27588:2014 *	2.0 VLRH	
Pusey & Jones	30 PJ to 300 PJ	ISO 48-8:2018 * (ISO 7267-3:2017 *) ASTM D 531:2015 *	2.0 Pusey & Jones (PJ)	
Barcol	30 Barcol to 90 Barcol	ASTM D 2583a:2013 * DIN EN 59:2016 *	2.0 Barcol	
Micro Shore A	0 M Shore A to 100 M Shore A	QMV7.2-1.1 Edition 05/2019	2.0 M Shore A	
Micro Shore D	30 M Shore D to 100 M Shore D	QMV7.2-1.1 Edition 05/2019	2.0 M Shore D	
0 – 2 N	0 N to 2.0 N	QMV7.2-1.1 Edition 05/2019	0.02 N	
0 – 20 N	0 N to 20.0 N	QMV7.2-1.1 Edition 05/2019	0.2 N	
<b>Hardness (MTM)</b> Device for penetration depthmeasurement kal-rock for Rockwell-Hardness-Testers	- 250 µm to 250 µm	QMV7.2-1.1 Edition 05/2019	0.3 µm	direct measurement with reference standards for extension

<sup>1)</sup> The expanded uncertainties according to EA-4/02 M:2013 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 95 % and have a coverage factor of  $k = 2$  unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.

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**Only On-site Calibration**

**Calibration and Measurement Capabilities (CMC)**

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement <sup>1)</sup>	Remarks
<b>Hardness (MTM)</b> Hardness testing machines according to Vickers- and Rockwell- Procedures	65 HV to 950 HV hardness scales HV 5 to HV 100	DIN EN ISO 6507-2:2018 *	1 %; but not < 1.5 · U <sub>CRM</sub>	indirect calibration with hardness reference blocks  U <sub>CRM</sub> : uncertainty of the hardness reference block
	65 HV to 950 HV hardness scales HV 0,01 to HV 3		2 %; but not < 1.5 · U <sub>CRM</sub>	
	20 HRA to 88 HRA	DIN EN ISO 6508-2:2015 *	0.5 HRA	
	20 HRB to 100 HRB		1.0 HRB	
	20 HRC to 70 HRC		0.6 HRC	
Optical indentation measuring device of Vickers-hardness testing machines	0.1 mm to 6,0 mm	DIN EN ISO 6507-2:2018 * ASTM E 384:2017 *	1.5·10 <sup>-3</sup> · l; but not < 0.5 µm	direct calibration with stage micrometer  l : measured extension
Depth measuring device of Rockwell- and ball indentation hardness testing machines	0 mm to 0.4 mm	DIN EN ISO 6508-2:2015 * ASTM E 18:2019 * DIN EN ISO 2039-1:2003 *	0.3 µm	direct calibration with depth calibration device
Force measuring device of hardness testing machines	0.1 N to 2500 N	DIN EN ISO 6507-2:2018 * DIN EN ISO 6508-2:2015 * DIN EN ISO 2039-1:2003 * DIN EN ISO 2039-2:2000 * ASTM E 384:2017 * ASTM E 18:2019 *	0.12 %	direct calibration with load cells (class 0) and precision balances
<b>Mechanical work (MTM)</b> Abrasion resistance tester	5 N to 20 N	DIN ISO 4649:2017 *	friction force: 0.12 % cylinder diameter: 0.05 mm friction distance: 0.02 m frequency: 0.05 min <sup>-1</sup>	the measuring uncertainty will be calculated separately for: 1. friction force 2. cylinder diameter 3. friction distance 4. frequency
Resilience elasticity tester (Schob-Pendulum)	0 J to 0.5 J	DIN 53512:2000 * ISO 4662:2017 *	force: 0.12 % pendulum length: 0.1 mm angle: 0.03° time: 0.2 s	the measuring uncertainty will be calculated separately for: 1. position of the oscillation center 2. potential energy 3. deviation of the indicated energy

**Abbreviations used:**

ASTM            ASTM American Society for Testing and Materials  
CMC             Calibration and measurement capabilities  
QMV             internal calibration procedure of Bareiss Prüfgerätekau GmbH

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