

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 <p>UKAS CALIBRATION</p> <p>0441</p> <p>Accredited to ISO/IEC 17025:2017</p>	<p>Euro Products Ltd</p> <p>Issue No: 044 Issue date: 18 August 2021</p>	
	<p>Yardley House Yardley Street Stourbridge DY9 7AT United Kingdom</p>	<p>Contact: David Perkins Tel: +44 (0)1384 895000 Fax: +44 (0)1384 897000 E-Mail: sales@europroducts.co.uk Website: www.europroducts.co.uk</p>
<p>Calibration performed at the above address only</p>		

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
HARDNESS INDENTERS			
Rockwell A, C, D and N diamond indenters for testing and standardizing machines	Cone angle Tip radius Straightness of flank cone Length of straight flank Axis	0.03 degrees of arc 3 μm 0.26 μm 10 μm 0.03 degrees of arc	<p>Note 1 The calibrations of Rockwell diamond indenters shall be in accordance with the requirements of BS EN ISO 6508-2:2015 section 6.2, BS EN ISO 6508-3:2015 section 4.3, ASTM E18-20 Annex A.3</p>
Vickers diamond indenters for testing and standardizing machines	Angle between opposite faces of the diamond pyramid	0.05 degrees of arc	
Micro Vickers diamond indenters for testing and standardizing machines	Inclination of the axis of the diamond pyramid to the axis of the indenter (normal to the seating surface)		<p>Note 2 The calibration of Vickers and Knoop indenters shall be in accordance with the requirements of BS EN ISO 6507-2:2018 section 5.3, BS EN ISO 6507-3:2018 section 5.5, ASTM E92-17 Annex A.3, ASTM E384-17 Annex A1.2 BS EN ISO 4545-2:2018 section 5.3 BS EN ISO 4545-3:2018 section 5.5</p>
Knoop diamond indenters for testing and standardizing machines	Line of junction between opposite faces	0.5 μm	
Calibration of indenter holders	1/16" to 1/2" ball holders Ball Protrusion Ball holder hardness	See Note 3 3.5 μm 0.37 HRC	<p>Note 5. Portable indenters to DIN 50157 Part 1 & Part 2:2008</p> <p>Note 3 Steel and Carbide Balls ASTM E18-20 Annex A.3 BS EN ISO 6506-2:2018 ASTM E10-20 Annex A.3 BS EN ISO 6508-2:2015 section 6.3 BS EN ISO 6508-3:2015 section 4.4</p>



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
HARDNESS Calibration of Rockwell Reference Hardness Blocks	Rockwell scales: HRA Scale 87 to 92 80 to 87 70 to 80 20 to 70.0 HRB Scale 80 to 100 50 to 80 10 to 50 HRC Scale 60 to 72 40 to 60 10 to 40 HRD Scale 70 to 80 50 to 79 40 to 50 HRE Scale 89 to 100 75 to 89 65 to 75 HRF Scale 87 to 100 70 to 87 40 to 70 HRG Scale 80 to 83 40 to 80 10 to 40 HRH Scale 90 to 100 80 to 90 60 to 80 HRK Scale 70 to 100 30 to 70 HRL Scale 114 to 123 90 to 114 HRM Scale 100 to 118 68 to 100 HRP Scale 85 to 112	See Note 6 0.10 HRA 0.15 HRA 0.16 HRA 0.28 HRA 0.42 HRB 0.87 HRB 1.0 HRB 0.31 HRC 0.32 HRC 0.37 HRC 0.17 HRD 0.25 HRD 0.27 HRD 0.54 HRE 0.54 HRE 0.54 HRE 0.40 HRF 0.40 HRF 0.54 HRF 0.30 HRG 0.30 HRG 0.76 HRG 0.40 HRH 0.40 HRH 0.68 HRH 0.40 HRK 0.40 HRK 0.35 HRL 0.35 HRL 0.56 HRM 0.56 HRM 0.65 HRP	Note 6 The calibrations of Rockwell hardness test blocks shall be in accordance with the requirements of BS EN ISO 6508-3:2015 ASTM E18-20 Annex A.4



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HARDNESS (cont'd)			
Calibration of Rockwell Reference Hardness Blocks (cont'd)	Rockwell Scales	See Note 6	
	HRR Scale		
	120 to 123	0.23 HRR	
	86 to 120	0.40 HRR	
	HRS Scale		
	112 to 123	0.19 HRS	
	107 to 112	0.91 HRS	
	HRV Scale		
	104 to 120	0.20 HRV	
	80 to 104	0.61 HRV	
	HR15N Scale		
	90 to 95	0.18 HR15N	
	80 to 90	0.18 HR15N	
	40 to 80	0.39 HR15N	
	HR15T Scale		
	88 to 100	0.21 HR15T	
	80 to 88	0.21 HR15T	
	20 to 80	0.37 HR15T	
	HR15W Scale		
	89 to 100	0.53 HR15W	
	80 to 89	0.44 HR15W	
	HR15X Scale		
	88 to 100	0.33 HR15X	
	80 to 88	0.62 HR15X	
	HR15Y Scale		
	88 to 98	0.63 HR15Y	
	HR30N Scale		
	77 to 87	0.27 HR30N	
	60 to 77	0.27 HR30N	
	40 to 60	0.55 HR30N	
	HR30T Scale		
	57 to 85	0.39 HR30T	
	50 to 57	0.66 HR30T	
	20 to 50	0.90 HR30T	
	HR30W Scale		
	65 to 100	0.76 HR30W	
	HR30X Scale		
	79 to 100	0.15 HR30X	
	HR30Y Scale		
	88 to 100	0.37 HR30Y	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
HARDNESS (cont'd)			
Calibration of Rockwell Reference Hardness Blocks (cont'd)	Rockwell scales: HR45N Scale 67 to 80 50 to 67 19 to 50 HR45T Scale 50 to 75 40 to 50 10 to 40 HR45W Scale 49 to 100 HR45X Scale 69 to 100 HR45Y Scale 82 to 100	See Note 6 0.18 HR45N 0.21 HR45N 0.43 HR45N 0.40 HR45T 0.40 HR45T 0.73 HR45T 0.12 HR45W 0.34 HR45X 0.29 HR45Y	
Calibration of Vickers Reference Hardness Blocks	Vickers scales: HV0.010 35 to 45 HV0.025 35 to 116 HV0.050 35 to 100 HV0.050 100 to 200 HV0.050 200 to 232 HV0.1 35 to 100 HV0.1 100 to 200 HV0.1 200 to 300 HV0.1 300 to 400 HV0.1 400 to 464 HV0.2 35 to 100 HV0.2 100 to 200 HV0.2 200 to 300 HV0.2 300 to 400 HV0.2 400 to 500 HV0.2 500 to 600 HV0.2 600 to 700 HV0.2 700 to 800 HV0.2 800 to 900 HV0.2 900 to 927	See Note 7 2.0 HV 6.0 HV 4.0 HV 10 HV 12 HV 3.0 HV 7.0 HV 13 HV 20 HV 25 HV 2.0 HV 6.0 HV 10 HV 15 HV 20 HV 26 HV 33 HV 40 HV 47 HV 49 HV	Note 7 The calibration of Vickers hardness test blocks requirements of BS EN ISO 6507-3:2018, ASTM E92-17 Annex A.4, ASTM E384-17 Annex A.2



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
HARDNESS (cont'd) Calibration of Vickers Reference Hardness Blocks (cont'd)	Vickers scales:	See Note 7	
	HV0.3 35 to 100	2.0 HV	
	HV0.3 100 to 200	5.0 HV	
	HV0.3 200 to 300	8.0 HV	
	HV0.3 300 to 400	13 HV	
	HV0.3 400 to 500	17 HV	
	HV0.3 500 to 600	22 HV	
	HV0.3 600 to 700	28 HV	
	HV0.3 700 to 800	33 HV	
	HV0.3 800 to 900	40 HV	
	HV0.3 900 to 1000	46 HV	
	HV0.3 1000 to 1100	53 HV	
	HV0.3 1100 to 1200	60 HV	
	HV0.3 1200 to 1300	67 HV	
	HV0.3 1300 to 1391	74 HV	
	HV0.5 35 to 100	2.0 HV	
	HV0.5 100 to 200	4.0 HV	
	HV0.5 200 to 300	7.0 HV	
	HV0.5 300 to 400	10 HV	
	HV0.5 400 to 500	14 HV	
	HV0.5 500 to 600	18 HV	
	HV0.5 600 to 700	22 HV	
	HV0.5 700 to 800	27 HV	
	HV0.5 800 to 900	32 HV	
	HV0.5 900 to 1000	37 HV	
	HV0.5 1000 to 1100	42 HV	
	HV0.5 1100 to 1200	48 HV	
	HV0.5 1200 to 1300	54 HV	
	HV0.5 1300 to 1400	60 HV	
	HV0.5 1400 to 1500	66 HV	
	HV0.5 1500 to 1600	72 HV	
	HV0.5 1600 to 1700	79 HV	
	HV0.5 1700 to 1800	86 HV	
	HV0.5 1800 to 1900	93 HV	
	HV0.5 1900 to 2000	100 HV	
	HV1 35 to 100	1.0 HV	
	HV1 100 to 200	3.0 HV	
	HV1 200 to 300	5.0 HV	
	HV1 300 to 400	8.0 HV	
	HV1 400 to 500	11 HV	
	HV1 500 to 600	14 HV	
	HV1 600 to 700	17 HV	
HV1 700 to 800	20 HV		
HV1 800 to 900	24 HV		
HV1 900 to 1000	28 HV		
HV1 1000 to 1100	32 HV		
HV1 1100 to 1200	36 HV		
HV1 1200 to 1300	40 HV		
HV1 1300 to 1400	45 HV		
HV1 1400 to 1500	49 HV		
HV1 1500 to 1600	54 HV		
HV1 1600 to 1700	59 HV		
HV1 1700 to 1800	64 HV		
HV1 1800 to 1900	69 HV		
HV1 1900 to 2000	74 HV		



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HARDNESS (cont'd) Calibration of Vickers Reference Hardness Blocks (cont'd)	Vickers scales	See Note 7	
	HV2 35 to 100	1.0 HV	
	HV2 100 to 200	2.0 HV	
	HV2 200 to 300	4.0 HV	
	HV2 300 to 400	6.0 HV	
	HV2 400 to 500	8.0 HV	
	HV2 500 to 600	11 HV	
	HV2 600 to 700	13 HV	
	HV2 700 to 800	16 HV	
	HV2 800 to 900	18 HV	
	HV2 900 to 1000	21 HV	
	HV2 1000 to 1100	24 HV	
	HV2 1100 to 1200	27 HV	
	HV2 1200 to 1300	30 HV	
	HV2 1300 to 1400	34 HV	
	HV2 1400 to 1500	37 HV	
	HV2 1500 to 1600	41 HV	
	HV2 1600 to 1700	44 HV	
	HV2 1700 to 1800	48 HV	
	HV2 1800 to 1900	52 HV	
	HV2.5 35 to 100	1.0 HV	
	HV2.5 100 to 200	2.0 HV	
	HV2.5 200 to 300	4.0 HV	
	HV2.5 300 to 400	6.0 HV	
	HV2.5 400 to 500	8.0 HV	
	HV2.5 500 to 600	10 HV	
	HV2.5 600 to 700	12 HV	
	HV2.5 700 to 800	14 HV	
	HV2.5 800 to 900	17 HV	
	HV2.5 900 to 1000	20 HV	
	HV2.5 1000 to 1100	22 HV	
	HV2.5 1100 to 1200	25 HV	
	HV2.5 1200 to 1300	28 HV	
	HV2.5 1300 to 1400	31 HV	
HV2.5 1400 to 1500	34 HV		
HV2.5 1500 to 1600	37 HV		
HV2.5 1600 to 1700	41 HV		
HV2.5 1700 to 1800	44 HV		
HV2.5 1800 to 1900	47 HV		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
HARDNESS (cont'd)			
Calibration of Vickers Reference Hardness locks (cont'd)	HV3 35 to 100	1.0 HV	
	HV3 100 to 200	2.0 HV	
	HV3 200 to 300	4.0 HV	
	HV3 300 to 400	5.0 HV	
	HV3 400 to 500	7.3 HV	
	HV3 500 to 600	9.3 HV	
	HV3 600 to 700	11 HV	
	HV3 700 to 800	14 HV	
	HV3 800 to 900	16 HV	
	HV3 900 to 1000	18 HV	
	HV3 1000 to 1100	21 HV	
	HV3 1100 to 1200	23 HV	
	HV3 1200 to 1300	26 HV	
	HV3 1300 to 1400	29 HV	
	HV3 1400 to 1500	32 HV	
	HV3 1500 to 1600	35 HV	
	HV3 1600 to 1700	38 HV	
	HV3 1700 to 1800	41 HV	
	HV3 1800 to 1900	44 HV	
	HV5 35 to 100	0.8 HV	
	HV5 100 to 200	2.0 HV	
	HV5 200 to 300	3.0 HV	
	HV5 300 to 400	5.0 HV	
	HV5 400 to 500	6.0 HV	
	HV5 500 to 600	8.0 HV	
	HV5 600 to 700	10 HV	
	HV5 700 to 800	11 HV	
	HV5 800 to 900	13 HV	
	HV5 900 to 1000	15 HV	
	HV5 1000 to 1100	17 HV	
	HV5 1100 to 1200	20 HV	
	HV5 1200 to 1300	22 HV	
	HV5 1300 to 1400	24 HV	
	HV5 1400 to 1500	26 HV	
	HV5 1500 to 1600	29 HV	
	HV5 1600 to 1700	31 HV	
	HV5 1700 to 1800	34 HV	
	HV5 1800 to 1900	36 HV	



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HARDNESS (cont'd)			
Calibration of Vickers Reference Hardness locks (cont'd)	HV10 35 to 100	0.7 HV	
	HV10 100 to 200	1.7 HV	
	HV10 200 to 300	3.0 HV	
	HV10 300 to 400	4.0 HV	
	HV10 400 to 500	5.0 HV	
	HV10 500 to 600	6.0 HV	
	HV10 600 to 700	8.0 HV	
	HV10 700 to 800	9.0 HV	
	HV10 800 to 900	11 HV	
	HV10 900 to 1000	12 HV	
	HV10 1000 to 1100	14 HV	
	HV10 1100 to 1200	16 HV	
	HV10 1200 to 1300	17 HV	
	HV10 1300 to 1400	19 HV	
	HV10 1400 to 1500	21 HV	
	HV10 1500 to 1600	23 HV	
	HV10 1600 to 1700	25 HV	
	HV10 1700 to 1800	27 HV	
	HV10 1800 to 1900	29 HV	
	HV20 35 to 100	0.6 HV	
	HV20 100 to 200	1.0 HV	
	HV20 200 to 300	2.0 HV	
	HV20 300 to 400	3.0 HV	
	HV20 400 to 500	4.0 HV	
	HV20 500 to 600	5.0 HV	
	HV20 600 to 700	7.0 HV	
	HV20 700 to 800	8.0 HV	
	HV20 800 to 900	9.0 HV	
	HV20 900 to 1000	10 HV	
	HV20 1000 to 1100	11 HV	
	HV20 1100 to 1200	13 HV	
	HV20 1200 to 1300	14 HV	
	HV20 1300 to 1400	16 HV	
	HV20 1400 to 1500	17 HV	
	HV20 1500 to 1600	18 HV	
	HV20 1600 to 1700	20 HV	
	HV20 1700 to 1800	21 HV	
	HV20 1800 to 1900	23 HV	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
HARDNESS (cont'd) Calibration of Vickers Reference Hardness Blocks (cont'd)	Vickers scales: HV30 35 to 100 HV30 100 to 200 HV30 200 to 300 HV30 300 to 400 HV30 400 to 500 HV30 500 to 600 HV30 600 to 700 HV30 700 to 800 HV30 800 to 900 HV30 900 to 1000 HV30 1000 to 1100 HV30 1100 to 1200 HV30 1200 to 1300 HV30 1300 to 1400 HV30 1400 to 1500 HV30 1500 to 1600 HV30 1600 to 1700 HV30 1700 to 1800 HV30 1800 to 1900 HV50 35 to 100 HV50 100 to 200 HV50 200 to 300 HV50 300 to 400 HV50 400 to 500 HV50 500 to 600 HV50 600 to 700 HV50 700 to 800 HV50 800 to 900 HV50 900 to 1000 HV50 1000 to 1100 HV50 1100 to 1200 HV50 1200 to 1300 HV50 1300 to 1400 HV50 1400 to 1500 HV50 1500 to 1600 HV50 1600 to 1700 HV50 1700 to 1800 HV50 1800 to 1900	See Note 7 0.5 HV 1.0 HV 2.0 HV 3.0 HV 4.0 HV 5.0 HV 6.0 HV 7.0 HV 8.0 HV 9.0 HV 10 HV 12 HV 13 HV 14 HV 15 HV 17 HV 18 HV 19 HV 21 HV 0.4 HV 1.0 HV 1.5 HV 2.5 HV 3.5 HV 4.5 HV 5.0 HV 6.0 HV 7.0 HV 8.0 HV 9.0 HV 10 HV 11 HV 12 HV 14 HV 15 HV 16 HV 17 HV 18 HV	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
HARDNESS (cont'd)			
Calibration of Vickers Reference Hardness Blocks (cont'd)	Vickers scales: HV100 35 to 100 HV100 100 to 200 HV100 200 to 300 HV100 300 to 400 HV100 400 to 500 HV100 500 to 600 HV100 600 to 700 HV100 700 to 800 HV100 800 to 900 HV100 900 to 1000 HV100 1000 to 1100 HV100 1100 to 1200 HV100 1200 to 1300 HV100 1300 to 1400 HV100 1400 to 1500 HV100 1500 to 1600 HV100 1600 to 1700 HV100 1700 to 1800 HV100 1800 to 1900	See Note 7 0.4 HV 0.9 HV 1.5 HV 2.0 HV 2.5 HV 3.5 HV 4.0 HV 5.0 HV 6.0 HV 6.5 HV 7.5 HV 8.5 HV 9.5 HV 10.5 HV 11.5 HV 12.5 HV 13.5 HV 14.5 HV 15.5 HV	
Certification of reference Vickers hardness measurements & Vickers Reading Blocks	All ranges	0.50 μm	
Calibration of Knoop hardness reference blocks	Knoop Scales HK0.005 35 to 100 HK0.005 100 to 178 HK0.010 35 to 100 HK0.010 100 to 200 HK0.010 200 to 300 HK0.010 300 to 356 HK0.025 35 to 100 HK0.025 100 to 200 HK0.025 200 to 300 HK0.025 300 to 400 HK0.025 400 to 500 HK0.025 500 to 600 HK0.025 600 to 700 HK0.025 700 to 800 HK0.025 800 to 889	See note 8 4.5 HK 10 HK 3.0 HK 3.0 HK 16 HK 21HK 2.5 HK 6.5HK 14.5 HK 17 HK 23 HK 30HK 37 HK 44 HK 52HK	Note 8 The calibration of Knoop hardness test blocks shall be in accordance with the requirements of BS EN ISO 4545-3:2017 ASTM E92-17 Annex A.4 ASTM E384-17 Annex A.2



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
HARDNESS (cont'd) Calibration of Knoop hardness reference blocks (cont'd)	Knoop Scales HK 0.050 35 to 100 HK 0.050 100 to 200 HK 0.050 200 to 300 HK 0.050 300 to 400 HK 0.050 400 to 500 HK 0.050 500 to 600 HK 0.050 600 to 700 HK 0.050 700 to 800 HK 0.050 800 to 900 HK 0.050 900 to 1000 HK 0.050 1000 to 1100 HK 0.050 1100 to 1200 HK 0.050 1200 to 1300 HK 0.050 1300 to 1400 HK 0.050 1400 to 1500 HK 0.050 1500 to 1600 HK 0.050 1600 to 1700 HK 0.050 1700 to 1779 HK 0.1 35 to 100 HK 0.1 100 to 200 HK 0.1 200 to 300 HK 0.1 300 to 400 HK 0.1 400 to 500 HK 0.1 500 to 600 HK 0.1 600 to 700 HK 0.1 700 to 800 HK 0.1 800 to 900 HK 0.1 900 to 1000 HK 0.1 1000 to 1100 HK 0.1 1100 to 1200 HK 0.1 1200 to 1300 HK 0.1 1300 to 1400 HK 0.1 1400 to 1500 HK 0.1 1500 to 1600 HK 0.1 1600 to 1700 HK 0.1 1700 to 1800 HK 0.1 1800 to 1900 HK 0.2 35 to 100 HK 0.2 100 to 200 HK 0.2 200 to 300 HK 0.2 300 to 400 HK 0.2 400 to 500 HK 0.2 500 to 600 HK 0.2 600 to 700 HK 0.2 700 to 800 HK 0.2 800 to 900 HK 0.2 900 to 1000	See note 8 2.0 HK 5.0 HK 9.0 HK 13 HK 18 HK 23 HK 28.5 HK 34 HK 40 HK 46.5 HK 53 HK 60 HK 66 HK 74 HK 81 HK 89 HK 97 HK 103 HK 1.5 HK 4.0 HK 7.0 HK 10 HK 14 HK 18 HK 22 HK 26 HK 31 HK 36 HK 41 HK 46 HK 51 HK 57 HK 62 HK 68 HK 74 HK 80 HK 86 HK 1.5 HK 3.5 HK 6.0 HK 8.0HK 11 HK 14 HK 18 HK 21 HK 25 HK 28 HK	



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HARDNESS (cont'd)			
Calibration of Knoop hardness reference blocks (cont'd)	Knoop Scales	See note 8	
	HK 0.2 1000 to 1100	32 HK	
	HK 0.2 1100 to 1200	36 HK	
	HK 0.2 1200 to 1300	40 HK	
	HK 0.2 1300 to 1400	44 HK	
	HK 0.2 1400 to 1500	49 HK	
	HK 0.2 1500 to 1600	53 HK	
	HK 0.2 1600 to 1700	57 HK	
	HK 0.2 1700 to 1800	62 HK	
	HK 0.2 1800 to 1900	67 HK	
	HK 0.3 35 to 100	1.5 HK	
	HK 0.3 100 to 200	3.0 HK	
	HK 0.3 200 to 300	5.0 HK	
	HK 0.3 300 to 400	7.0 HK	
	HK 0.3 400 to 500	10 HK	
	HK 0.3 500 to 600	13 HK	
	HK 0.3 600 to 700	16 HK	
	HK 0.3 700 to 800	18 HK	
	HK 0.3 800 to 900	22 HK	
	HK 0.3 900 to 1000	25 HK	
	HK 0.3 1000 to 1100	28 HK	
	HK 0.3 1100 to 1200	32 HK	
	HK 0.3 1200 to 1300	35 HK	
	HK 0.3 1300 to 1400	39 HK	
	HK 0.3 1400 to 1500	42 HK	
	HK 0.3 1500 to 1600	46 HK	
	HK 0.3 1600 to 1700	50 HK	
	HK 0.3 1700 to 1800	54 HK	
	HK 0.3 1800 to 1900	58 HK	
	HK 0.5 35 to 100	1.0 HK	
	HK 0.5 100 to 200	3.0 HK	
	HK 0.5 200 to 300	5.0 HK	
	HK 0.5 300 to 400	7.0 HK	
	HK 0.5 400 to 500	9.0 HK	
	HK 0.5 500 to 600	11 HK	
	HK 0.5 600 to 700	14 HK	
	HK 0.5 700 to 800	16 HK	
	HK 0.5 800 to 900	19 HK	
	HK 0.5 900 to 1000	21 HK	
	HK 0.5 1000 to 1100	24 HK	
	HK 0.5 1100 to 1200	27 HK	
	HK 0.5 1200 to 1300	30 HK	
	HK 0.5 1300 to 1400	33 HK	
	HK 0.5 1400 to 1500	36 HK	
	HK 0.5 1500 to 1600	40 HK	
	HK 0.5 1600 to 1700	43 HK	
	HK 0.5 1700 to 1800	46 HK	
	HK 0.5 1800 to 1900	49 HK	



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HARDNESS (cont'd)			
Calibration of Knoop hardness reference blocks (cont'd)	Knoop Scales HK 1 35 to 100 HK 1 100 to 200 HK 1 200 to 300 HK 1 300 to 400 HK 1 400 to 500 HK 1 500 to 600 HK 1 600 to 700 HK 1 700 to 800 HK 1 800 to 900 HK 1 900 to 1000 HK 1 1000 to 1100 HK 1 1100 to 1200 HK 1 1200 to 1300 HK 1 1300 to 1400 HK 1 1400 to 1500 HK 1 1500 to 1600 HK 1 1600 to 1700 HK 1 1700 to 1800 HK 1 1800 to 1900	See note 8 1.0 HK 2.0 HK 4.0 HK 6.0 HK 8.0 HK 10 HK 12 HK 14 HK 16 HK 18 HK 20 HK 23 HK 25 HK 27 HK 30 HK 32 HK 35 HK 38 HK 40 HK	
Certification of reference Knoop hardness measurements & Knoop Reading Blocks	All ranges	0.50 μm	
Calibration of Brinell Reference Hardness Blocks	Brinell Scales: Ratio (F/D ²) = 30 10/3000 600 HBW to 650 HBW 10/3000 500 HBW to 600 HBW 10/3000 400 HBW to 500 HBW 10/3000 300 HBW to 400 HBW 10/3000 200 HBW to 300 HBW 10/3000 95 HBW to 200 HBW 5/750 600 HBW to 650 HBW 5/750 500 HBW to 600 HBW 5/750 400 HBW to 500 HBW 5/750 300 HBW to 400 HBW 5/750 200 HBW to 300 HBW 5/750 95 HBW to 200 HBW 2.5/187.5 600 HBW to 650 HBW 2.5/187.5 500 HBW to 600 HBW 2.5/187.5 400 HBW to 500 HBW 2.5/187.5 300 HBW to 400 HBW 2.5/187.5 200 HBW to 300 HBW 2.5/187.5 95 HBW to 200 HBW 1/30 600 HBW to 650 HBW 1/30 500 HBW to 600 HBW 1/30 400 HBW to 500 HBW 1/30 300 HBW to 400 HBW 1/30 200 HBW to 300 HBW 1/30 95 HBW to 200 HBW	See Note 9 7.1 HBW 6.5 HBW 5.4 HBW 4.2 HBW 3.2 HBW 2.1 HBW 7.0 HBW 6.6 HBW 5.7 HBW 4.6 HBW 3.4 HBW 2.2 HBW 8.7 HBW 8.0 HBW 6.5 HBW 5.0 HBW 3.7 HBW 2.4 HBW 11.9 HBW 10.8 HBW 8.7 HBW 6.6 HBW 4.8 HBW 3.0 HBW	Note 9 The calibrations of Brinell hardness test blocks shall be in accordance with the requirements of BS EN ISO 6506-3:2014 and ASTM E10-18 Annex A.4.



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2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

Euro Products Ltd
Issue No: 044 Issue date: 18 August 2021

Calibration performed at main address only

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
HARDNESS (cont'd) Calibration of Brinell Reference Hardness Blocks (cont'd)	Brinell Scale: Ratio (F/D ²) = 15 10/1500 300 HBW to 327 HBW 10/1500 200 HBW to 300 HBW 10/1500 100 HBW to 200 HBW 10/1500 47 HBW to 100 HBW Ratio (F/D ²) = 10 10/1000 200 HBW to 218 HBW 10/1000 100 HBW to 200 HBW 10/1000 40 HBW to 100 HBW 5/250 200 HBW to 218 HBW 5/250 100 HBW to 200 HBW 5/250 47 HBW to 100 HBW Ratio (F/D ²) = 10 2.5/62.5 200 HBW to 218 HBW 2.5/62.5 100 HBW to 200 HBW 2.5/62.5 47 HBW to 100 HBW 1/10 200 HBW to 218 HBW 1/10 100 HBW to 200 HBW 1/10 47 HBW to 100 HBW Ratio (F/D ²) = 5 10/500 100 HBW to 109 HBW 10/500 47 HBW to 100 HBW 5/125 100 HBW to 109 HBW 5/125 47 HBW to 100 HBW 2.5/31.25 100 HBW to 109 HBW 2.5/31.25 47 HBW to 100 HBW 1/5 100 HBW to 109 HBW 1/5 47 HBW to 100 HBW Ratio (F/D ²) = 2.5 10/250 35.0 to 55 5/62.5 20 to 55 2.5/15.625 20 to 55 1/2.5 20 to 55 Ratio (F/D ²) = 1.25 10/125 20 5/31.25 20 2.5/7.8125 20 1/1.25 20 Ratio (F/D ²) = 1 10/100 20 5/25 20 2.5/6.25 20 1/1 20 2.5/62.5 60 HBW-T to 96 HBW-T	See Note 9 3.5 HBW 3.3 HBW 2.1 HBW 1.1 HBW 2.4 HBW 2.2 HBW 1.1 HBW 2.6 HBW 2.3 HBW 1.1 HBW 3.1 HBW 2.6 HBW 1.2 HBW 4.1 HBW 3.6 HBW 1.6 HBW 1.2 HBW 1.1 HBW 1.3 HBW 1.1 HBW 1.5 HBW 1.4 HBW 2.0 HBW 1.8 HBW 0.65 HBW 0.65 HBW 0.75 HBW 1.1 HBW 0.20 HBW 0.20 HBW 0.30 HBW 0.50 HBW 0.20 HBW 0.20 HBW 0.20 HBW 0.20 HBW 0.68 HBW-T	



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks
Certification of reference Brinell hardness measurements & Brinell Reading Blocks	All ranges	1 μm	
Calibration of Leeb hardness reference blocks	Leeb Scale: HLC HLD HLDL HLE HLG HLS	See note 4 6.0 Leeb units 6.0 Leeb units 6.0 Leeb units 6.0 Leeb units 6.0 Leeb units 6.0 Leeb units	4. Traceability to manufacturers specification. Calibrations to be in accordance with ASTM A956/A956M-17 and DIN 50156 Part 3 :2007

END



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Appendix - Calibration and Measurement Capabilities

Introduction

The definitive statement of the accreditation status of a calibration laboratory is the Accreditation Certificate and the associated Schedule of Accreditation. This Schedule of Accreditation is a critical document, as it defines the measurement capabilities, ranges and boundaries of the calibration activities for which the organisation holds accreditation.

Calibration and Measurement Capabilities (CMCs)

The capabilities provided by accredited calibration laboratories are described by the Calibration and Measurement Capability (CMC), which expresses the lowest measurement uncertainty that can be achieved during a calibration. If a particular device under calibration itself contributes significantly to the uncertainty (for example, if it has limited resolution or exhibits significant non-repeatability) then the uncertainty quoted on a calibration certificate will be increased to account for such factors.

The CMC is normally used to describe the uncertainty that appears in an accredited calibration laboratory's schedule of accreditation and is the uncertainty for which the laboratory has been accredited using the procedure that was the subject of assessment. The measurement uncertainty is calculated according to the procedures given in the GUM and is normally stated as an expanded uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k = 2$. An accredited laboratory is not permitted to quote an uncertainty that is smaller than the published measurement uncertainty in certificates issued under its accreditation.

Expression of CMCs - symbols and units

It should be noted that the percentage symbol (%) represents the number 0.01. In cases where the measurement uncertainty is stated as a percentage, this is to be interpreted as meaning percentage of the measurand. Thus, for example, a measurement uncertainty of 1.5 % means $1.5 \times 0.01 \times q$, where q is the quantity value.

The notation $Q[a, b]$ stands for the root-sum-square of the terms between brackets: $Q[a, b] = [a^2 + b^2]^{1/2}$