Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0232
Accredited to
ISO/IEC 17025:2017

Indentec Hardness Testing Machines Ltd

Issue No: 039 **Issue date:** 27 August 2021

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Calibration performed by the Organisations at the locations specified below

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Address Unit 30 Navigation Drive Hurst Business Park Brierley Hill West Midlands DY5 1UT United Kingdom **Local contact** Mr M.Wood	Hardness Indentors, ball Ball Indentor holders Test blocks, Brinell Test blocks, Rockwell Test blocks, Vickers Test blocks, Knoop Calibration machines, Rockwell, direct Testing machines, Rockwell, direct Calibration machines, Rockwell, Indirect Testing machines, Rockwell, indirect Calibration machines, Vickers,and Knoop direct Testing machines, Vickers,and Knoop direct Calibration machines, Vickers,and Knoop Indirect Testing machines, Vickers,and Knoop indirect Calibration machines, Brinell, direct Testing machines, Brinell, direct Calibration machines, Brinell, indirect Testing machines, Brinell, indirect	P

Site activities performed away from the locations listed above:

Location details	Activity	Location code
At Customers Premises	Hardness Calibration machines, Rockwell, direct Testing machines, Rockwell, direct Calibration machines, Rockwell, Indirect Testing machines, Rockwell, indirect Calibration machines, Vickers and Knoop direct Testing machines, Vickers, and Knoop direct Calibration machines, Vickers, and Knoop Indirect Testing machines, Vickers,and Knoop indirect Calibration machines, Brinell, direct Testing machines, Brinell, direct Calibration machines, Brinell, indirect Testing machines, Brinell, indirect	S

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Calibration performed by the Organisation at the locations specified

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
VERIFICATION OF HARDNESS MACHINES IN SERVICE				
Direct verification of Rockwell Hardness Calibration and Testing Machines	Rockwell scales: A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, N, T, W, X and Y Force Time Length	See Note 1 0.12 % force 0.10 second 0.10 μm	Note 1 The calibration / verification shall be in accordance with the requirements of BS EN ISO 6508-2:2015, BS EN ISO 6508-3:2015 and / or ASTM E18-20 Accreditation is limited to machines manufactured by Indentec Hardness Testing Machines Ltd & Zwick Roell. Accreditation excludes Rockwell portable hardness testing machines	P & S
Indirect verification of Rockwell Hardness Calibration and Testing Machines	Rockwell scales: HRA Scale 80 to 85 70 to 80 60 to 70 HRBW Scale 80 50 to 80 10 to 50 HRC Scale 60 to 70 40 to 60 20 to 40 HRD Scale 70 to 80 50 to 70 40 to 50 HREW Scale 89 75 to 89 65 to 75 HRFW Scale 87 70 to 87 40 to 70 HRGW Scale 80 40 to 80 10 to 40	See Note 1 0.15 HRA 0.16 HRA 0.28 HRA 0.42 HRBW 0.87 HRBW 1.36 HRBW 0.31 HRC 0.32 HRC 0.37 HRC 0.17 HRD 0.25 HRD 0.27 HRD 0.54 HREW 0.54 HREW 0.54 HREW 0.40 HRFW 0.40 HRFW 0.54 HRFW 0.30 HRGW 0.30 HRGW 0.76 HRGW		P & S

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Indirect verification of Rockwell Hardness Calibration and Testing Machines (cont'd)	Rockwell Scales HRHW Scale 90 80 to 90 60 to 80 HRKW Scale 70 30 to 70 10 to 30 HRLW Scale 115 90 to 115 HRMW Scale 100 70 to 100 Rockwell Scales: HRPW Scale 85 40 to 85 HRRW Scale 120 100 to 120 HRSW Scale 112 110 to 112 HRVW Scale 104 to 120 80 to 104 HR15N Scale 90 to 95 80 to 90 40 to 80 HR15TW Scale 88 to 100 80 to 88 20 to 80 HR15WW Scale 89 to 100 80 to 89 HR15XW Scale 88 to 100 80 to 88	See Note 1 0.40 HRHW 0.40 HRHW 0.68 HRHW 0.40 HRKW 0.40 HRKW 0.64 HRKW 0.35 HRLW 0.35 HRLW 0.56 HRMW 0.56 HRMW See Note 1 0.65 HRPW 0.91 HRPW 0.23 HRRW 0.40 HRRW 0.19 HRSW 0.91 HRSW 0.20 HRVW 0.61 HRVW 0.18 HR15N 0.18 HR15N 0.39 HR15N 0.21 HR15TW 0.21 HT15TW 0.37 HR15TW 0.53 HR15WW 0.44 HR15WW 0.33 HR15XW 0.62 HR15XW		P & S

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Indirect verification of Rockwell Hardness Calibration and Testing Machines (cont'd)	Rockwell scales: HR15YW Scale 94 to 100 85 to 94 HR30N Scale 77 to 85 60 to 77 40 to 60 HR30TW Scale 57 to 85 50 to 57 20 to 50 HR30WW Scale 65 to 100 40 to 65 HR30XW Scale 79 to 100 60 to 79 HR30YW Scale 88 to 100 60 to 88 HR45N Scale 67 to 75 50 to 67 10 to 50 HR45TW Scale 50 to 75 40 to 50 10 to 40 HR45WW Scale 49 to 100 10 to 49 HR45XW Scale 69 to 100 40 to 69 HR45YW Scale 82 to 100 60 to 82	See Note 1 0.63 HR15YW 1.30 HR15YW 0.27 HR30N 0.27 HR30N 0.55 HR30N 0.39 HR30TW 0.66 HR30TW 0.90 HR30TW 0.76 HR30WW 0.90 HR30WW 0.15 HR30XW 0.99 HR30XW 0.37 HR30YW 0.82 HR30YW 0.18 HR45N 0.21 HR45N 0.43 HR45N 0.40 HR45TW 0.40 HR45TW 0.73 HR45TW 0.12 HR45WW 0.29 HR45WW 0.34 HR45XW 0.81 HR45XW 0.29 HR45YW 0.94 HR45YW		P & S

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Direct verification of Vickers and Knoop hardness Calibration and testing machines & Indentation Measuring Devices	Vickers scales: HV 50 to HV 0.05 HK 1.0 to HK 0.05 Force Time Length	See Note 2 0.12 % force 0.10 second 1.0 μm	Note 2 The calibration / verification shall be in accordance with the requirements of BS EN ISO 6507-2:2018, BS EN ISO 6507-3:2018, BS EN ISO 4545-2:2017, BS EN ISO 4545-3:2017, ASTM E384-17 and ASTM E92-17	P & S
Indirect verification of Vickers hardness Calibration and testing machines	Vickers scales: HV 100 200 HV 100 400 HV 100 700 HV 50 200 HV 50 400 HV 50 700 HV 30 200 HV 30 400 HV 30 700 HV 20 200 HV 20 400 HV 20 700 HV 10 200 HV 10 400 HV 10 700 HV5 200 HV5 400 HV5 700 HV3 200 HV3 400 HV3 700 HV1 200 HV1 400 HV1 700 HV 0.5 200 HV 0.5 400 HV 0.5 700 HV 0.3 200 HV 0.3 400 HV 0.3 700 HV 0.2 200 HV 0.2 400 HV 0.2 700	See Note 2 1.2 HV 3.4 HV 4.1 HV 1.9 HV 3.5 HV 6.3 HV 2.0 HV 4.4 HV 9.3 HV 2.5 HV 6.2 HV 11.0 HV 3.1 HV 7.7 HV 14.9 HV 3.9 HV 11.0 HV 19.7 HV 6.9 HV 16.3 HV 31.0 HV 8.7 HV 21.4 HV 44.0 HV 5.0 HV 15.0 HV 17.0 HV 6.0 HV 16.0 HV 19.0 HV 7.0 HV 17.0 HV 20.0 HV		P & S

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Indirect verification of Vickers hardness Calibration and testing machines (cont'd)	HV 0.1 200 HV 0.1 400 HV 0.1 700	10.0 HV 30.0 HV 40.0 HV		P & S
Indirect verification of Knoop hardness Calibration and testing machines	Knoop Scales HK 0.05 200 HK 0.05 400 HK 0.05 700 Knoop Scales: HK 0.1 200 HK 0.1 400 HK 0.1 700 HK 0.2 200 HK 0.2 400 HK 0.2 700 HK 0.3 200 HK 0.3 400 HK 0.3 700 HK 0.5 200 HK 0.5 400 HK 0.5 700 HK1 200 HK1 400 HK1 700	See Note 2 8.5 HK 19.0 HK 27.0 HK See Note 2 8.0 HK 18.0 HK 25.0 HK 7.0 HK 17.0 HK 20.0 HK 6.0 HK 16.0 HK 19.0 HK 5.0 HK 15.0 HK 17.0 HK 8.7 HK 21.4 HK 44.0 HK		P & S
Direct verification of Brinell Hardness Calibration and Testing Machines	Brinell scales: From HBW 10/3000 to HBW 1/1 Force Time Length	See Note 3 0.24 % 0.10 second 10 μm	3 The calibration / verification shall be in accordance with the requirements of BS EN ISO 6506-2:2018 BS EN ISO 6506-3:2014 and /or ASTM E10-18	P & S
Indirect verification of Brinell Hardness Calibration and Testing Machines	Brinell scales: Scale 10/3000 600HBW to 140 HBW Scale 10/1500 299 HBW to 55 HBW Scale 10/1000 169 HBW to 55 HBW Scale 5/750 600 HBW to 140 HBW Scale 5/250 169 HBW to 55 HBW	See Notes 3 8.0 HBW to 2.2 HBW 4.1 HBW to 1.2 HBW 2.3 HBW to 1.2 HBW 9.8 HBW to 2.4 HBW 2.7 HBW to 1.3 HBW		P & S

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Indirect verification of Brinell Hardness Calibration and Testing Machines (cont'd)	Scale 2.5/187.5 600 HBW to 140 HBW Scale 1/1 21.8 HBW to 3.18 HBW	 16 HBW to 2.9 HBW 1.04 HBW to 0.09 HBW		P & S
Calibration of indenter holders	1/16" to ½" ball holders Ball Protrusion Ball holder hardness	See Note 4 3.5 μm 0.37 HRC	Note 4 The calibration / verification shall be in accordance with the requirements of ASTM E18-20. The hardness of the ball holder can also be made using the Vickers hardness scale and the results converted to Rockwell hardness values.	P
Calibration of indentor balls	1 mm to 12.7 mm (½ inch)	See Note 5	Note 5 The calibration / verification shall be in accordance with the requirements of BS EN ISO 6508 and ASTM E18-20 for Rockwell and BS EN ISO 6506 and ASTM E10-18 for Brinell,	P
Calibration of Rockwell Standardised Hardness Blocks	Rockwell scales: HRA Scale 87 to 92 80 to 87 70 to 80 60 to 70.0 HRBW 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 HREW Scale 89 to 100 75 to 89 65 to 75	See Note 6 0.10 HRA 0.15 HRA 0.16 HRA 0.28 HRA 0.42 HRBW 0.87 HRBW 1.0 HRBW 0.31 HRC 0.32 HRC 0.37 HRC 0.17 HRD 0.25 HRD 0.27 HRD 0.54 HREW 0.54 HREW 0.54 HREW	Note 6 The calibration shall be in accordance with the requirements of BS EN ISO 6508-3:2015 and / or ASTM E18-20	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Rockwell Standardised Hardness Blocks (cont'd)	HRFW Scale 87 to 100 70 to 87 40 to 70 HRGW Scale 80 to 83 40 to 80 10 to 40 HRHW Scale 90 to 100 80 to 90 60 to 80 HRKW Scale 70 to 100 30 to 70 HRLW Scale 114 to 123 90 to 114 HRMW Scale 100 to 118 68 to 100 HRPW Scale 85 to 112 Rockwell Scales HRRW Scale 120 to 123 86 to 120 HRSW Scale 112 to 123 107 to 112 HRVW Scale 104 to 120 80 to 104 HR15N Scale 90 to 95 80 to 90 40 to 80 HR15TW Scale 88 to 100 80 to 88 20 to 80	 0.40 HRFW 0.40 HRFW 0.54 HRFW 0.30 HRGW 0.30 HRGW 0.76 HRGW 0.40 HRHW 0.40 HRHW 0.68 HRHW 0.40 HRKW 0.40 HRKW 0.35 HRLW 0.35 HRLW 0.56 HRMW 0.56 HRMW 0.65 HRPW See Note 1 0.23 HRRW 0.40 HRRW 0.19 HRSW 0.91 HRSW 0.20 HRVW 0.61 HRVW 0.18 HR15N 0.18 HR15N 0.39 HR15N 0.21 HR15TW 0.21 HT15TW 0.37 HR15TW		P

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Rockwell Standardised Hardness Blocks (cont'd)	HR15WW Scale 89 to 100 80 to 89 HR15XW Scale 88 to 100 80 to 88 HR15YW Scale 88 to 98 HR30N Scale 77 to 87 60 to 77 40 to 60 HR30TW Scale 57 to 85 50 to 57 20 to 50 HR30WW Scale 65 to 100 HR30XW Scale 79 to 100 HR30YW Scale 88 to 100 HR45N Scale 67 to 80 50 to 67 19 to 50 HR45TW Scale 50 to 75 40 to 50 10 to 40 HR45WW Scale 49 to 100 HR45XW Scale 69 to 100 HR45YW Scale 82 to 100	 0.53 HR15WW 0.44 HR15WW 0.33 HR15XW 0.62 HR15XW 0.63 HR15YW 0.27 HR30N 0.27 HR30N 0.55 HR30N 0.39 HR30TW 0.66 HR30TW 0.90 HR30TW 0.76 HR30WW 0.15 HR30XW 0.37 HR30YW 0.18 HR45N 0.21 HR45N 0.43 HR45N 0.40 HR45TW 0.40 HR45TW 0.73 HR45TW 0.12 HR45WW 0.34 HR45XW 0.29 HR45YW		P

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Vickers Reference Hardness Blocks	Vickers scales:	See Note 7	Note 7 The calibration shall be in accordance with the requirements of BS EN ISO 6507-3:2018, ASTM E384-17 and ASTM E92-17	P
	HV0.010 35 to 45	4.8 HV		
	HV0.025 35 to 116	11.9 HV		
	HV0.050 35 to 100	6.9 HV		
	HV0.050 100 to 200	19.2 HV		
	HV0.050 200 to 232	23.9 HV		
	HV0.1 35 to 100	4.9 HV		
	HV0.1 100 to 200	13.6 HV		
	HV0.1 200 to 300	24.8 HV		
	HV0.1 300 to 400	38.5 HV		
	HV0.1 400 to 464	47.7 HV		
	HV0.2 35 to 100	3.5 HV		
	HV0.2 100 to 200	9.8 HV		
	HV0.2 200 to 300	17.8 HV		
	HV0.2 300 to 400	27.2 HV		
	HV0.2 400 to 500	37.8 HV		
	HV0.2 500 to 600	49.6 HV		
	HV0.2 600 to 700	62.9 HV		
	HV0.2 700 to 800	76.9 HV		
	HV0.2 800 to 900	91.3 HV		
	HV0.2 900 to 927	95.4 HV		
	HV0.3 35 to 100	2.9 HV		
	HV0.3 100 to 200	8.1 HV		
	HV0.3 200 to 300	14.6 HV		
	HV0.3 300 to 400	22.4 HV		
	HV0.3 400 to 500	31.1 HV		
	HV0.3 500 to 600	40.7 HV		
	HV0.3 600 to 700	51.4 HV		
	HV0.3 700 to 800	62.6 HV		
	HV0.3 800 to 900	74.5 HV		
	HV0.3 900 to 1000	87.4 HV		
	HV0.3 1000 to 1100	100.7 HV		
	HV0.3 1100 to 1200	115.4 HV		
	HV0.3 1200 to 1300	129.2 HV		
	HV0.3 1300 to 1391	143.2 HV		
	HV0.5 35 to 100	2.3 HV		
	HV0.5 100 to 200	6.4 HV		
	HV0.5 200 to 300	11.5 HV		
	HV0.5 300 to 400	17.5 HV		
	HV0.5 400 to 500	24.4 HV		
	HV0.5 500 to 600	32.0 HV		
	HV0.5 600 to 700	40.2 HV		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Vickers Reference Hardness Blocks (cont'd)	Vickers Scales:	See Note 7		P
	HV0.5 700 to 800	48.8 HV		
	HV0.5 800 to 900	58.3 HV		
	HV0.5 900 to 1000	67.9 HV		
	HV0.5 1000 to 1100	78.1 HV		
	HV0.5 1100 to 1200	89.4 HV		
	HV0.5 1200 to 1300	100.8 HV		
	HV0.5 1300 to 1400	111.7 HV		
	HV0.5 1400 to 1500	124.1 HV		
	HV0.5 1500 to 1600	136.8 HV		
	HV0.5 1600 to 1700	149.3 HV		
	HV0.5 1700 to 1800	163.5 HV		
	HV0.5 1800 to 1900	177.1 HV		
	HV0.5 1900 to 2000	192.3 HV		
	HV1 35 to 100	1.7 HV		
	HV1 100 to 200	4.6 HV		
	HV1 200 to 300	8.4 HV		
	HV1 300 to 400	12.7 HV		
	HV1 400 to 500	18.0 HV		
	HV1 500 to 600	23..0 HV		
	HV1 600 to 700	28.8 HV		
	HV1 700 to 800	35.1 HV		
	HV1 800 to 900	41.8 HV		
	HV1 900 to 1000	48.8 HV		
	HV1 1000 to 1100	56.1 HV		
	HV1 1100 to 1200	64.1 HV		
	HV1 1200 to 1300	71.9 HV		
	HV1 1300 to 1400	80.4 HV		
	HV1 1400 to 1500	88.8 HV		
	HV1 1500 to 1600	97.5 HV		
	HV1 1600 to 1700	107.5 HV		
	HV1 1700 to 1800	116.7 HV		
	HV1 1800 to 1900	125.7 HV		
	HV1 1900 to 2000	135.8 HV		
	HV2 35 to 100	1.3 HV		
	HV2 100 to 200	3.4 HV		
	HV2 200 to 300	6.1 HV		
	HV2 300 to 400	9.3 HV		
	HV2 400 to 500	12.8 HV		
	HV2 500 to 600	16.7 HV		
	HV2 600 to 700	20.9 HV		
	HV2 700 to 800	25.4 HV		
	HV2 800 to 900	30.2 HV		
	HV2 900 to 1000	35.3 HV		
	HV2 1000 to 1100	40.5 HV		
	HV2 1100 to 1200	46.1 HV		
	HV2 1200 to 1300	51.9 HV		
	HV2 1300 to 1400	57.7 HV		
	HV2 1400 to 1500	63.7 HV		
	HV2 1500 to 1600	70.1 HV		
	HV2 1600 to 1700	77.0 HV		
	HV2 1700 to 1800	83.7 HV		
	HV2 1800 to 1900	90.5 HV		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Vickers Reference Hardness Blocks (cont'd)	Vickers Scales: HV2.5 35 to 100 HV2.5 100 to 200 HV2.5 200 to 300 HV2.5 300 to 400 HV2.5 400 to 500 HV2.5 500 to 600 HV2.5 600 to 700 HV2.5 700 to 800 HV2.5 800 to 900 HV2.5 900 to 1000 HV2.5 1000 to 1100 HV2.5 1100 to 1200 HV2.5 1200 to 1300 HV2.5 1300 to 1400 HV2.5 1400 to 1500 HV2.5 1500 to 1600 HV2.5 1600 to 1700 HV2.5 1700 to 1800 HV2.5 1800 to 1900 HV3 35 to 100 HV3 100 to 200 HV3 200 to 300 HV3 300 to 400 HV3 400 to 500 HV3 500 to 600 HV3 600 to 700 HV3 700 to 800 HV3 800 to 900 HV3 900 to 1000 HV3 1000 to 1100 HV3 1100 to 1200 HV3 1200 to 1300 HV3 1300 to 1400 HV3 1400 to 1500 HV3 1500 to 1600 HV3 1600 to 1700 HV3 1700 to 1800 HV3 1800 to 1900 HV5 35 to 100 HV5 100.1 to 200 HV5 200.1 to 300 HV5 300.1 to 400 HV5 400.1 to 500	See Note7 1.2 HV 3.1 HV 5.5 HV 8.3 HV 11.5 HV 15.0 HV 18.8 HV 23.0 HV 27.0 HV 31.6 HV 36.4 HV 41.4 HV 46.5 HV 51.9 HV 57.6 HV 63.4 HV 69.3 HV 75.1 HV 81.5 HV 1.1 HV 2.9 HV 5.1 HV 7.7 HV 10.7 HV 13.9 HV 17.4 HV 21.1 HV 25.1 HV 29.2 HV 33.5 HV 38.1 HV 42.9 HV 47.9 HV 52.9 HV 58.0 HV 63.6 HV 69.1 HV 74.9 HV 0.9 HV 2.3 HV 4.1 HV 6.2 HV 8.6 HV		P

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Vickers Reference Hardness Blocks (cont'd)	Vickers Scales: HV5 500 to 600 HV5 600 to 700 HV5 700 to 800 HV5 800 to 900 HV5 900 to 1000 HV5 1000 to 1100 HV5 1100 to 1200 HV5 1200 to 1300 HV5 1300 to 1400 HV5 1400 to 1500 HV5 1500 to 1600 HV5 1600 to 1700 HV5 1700 to 1800 HV5 1800 to 1900 HV10 35 to 100 HV10 100 to 200 HV10 200 to 300 HV10 300 to 400 HV10 400 to 500 HV10 500 to 600 HV10 600 to 700 HV10 700 to 800 HV10 800 to 900 HV10 900 to 1000 HV10 1000 to 1100 HV10 1100 to 1200 HV10 1200 to 1300 HV10 1300 to 1400 HV10 1400 to 1500 HV10 1500 to 1600 HV10 1600 to 1700 HV10 1700 to 1800 HV10 1800 to 1900 HV20 35 to 100 HV20 100 to 200 HV20 200 to 300 HV20 300 to 400 HV20 400 to 500 HV20 500 to 600 HV20 600 to 700 HV20 700 to 800 HV20 800 to 900 HV20 900 to 1000 HV20 1000 to 1100 HV20 1100 to 1200 HV20 1200 to 1300 HV20 1300 to 1400 HV20 1400 to 1500 HV20 1500 to 1600 HV20 1600 to 1700 HV20 1700 to 1800 HV20 1800 to 1900	See Note 2 11.2 HV 13.9 HV 16.6 HV 19.9 HV 23.0 HV 26.4 HV 30.1 HV 33.8 HV 37.6 HV 41.2 HV 46.1 HV 49.8 HV 54.0 HV 58.6 HV 0.7 HV 1.8 HV 3.1 HV 4.7 HV 6.3 HV 8.2 HV 10.2 HV 12.5 HV 14.7 HV 17.1 HV 19.5 HV 22.1 HV 24.8 HV 27.7 HV 30.7 HV 33.7 HV 36.6 HV 39.8 HV 41.5 HV 0.6 HV 1.4 HV 2.5 HV 3.8 HV 4.7 HV 6.1 HV 8.3 HV 9.5 HV 11.5 HV 14.3 HV 16.2 HV 19.6 HV 20.5 HV 22.4 HV 25.6 HV 27.5 HV 30.4 HV 34.8 HV 35.5 HV		P

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
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 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	See Note 7 0.5 HV 1.2 HV 2.1 HV 3.1 HV 4.2 HV 5.3 HV 6.6 HV 8.0 HV 9.4 HV 10.8 HV 12.4 HV 14.8 HV 15.6 HV 17.3 HV 19.2 HV 21.0 HV 22.8 HV 24.7 HV 26.8 HV 0.4 HV 1.1 HV 1.8 HV 2.6 HV 3.5 HV 4.5 HV 5.5 HV 6.6 HV 7.5 HV 8.9 HV 10.1 HV 11.5 HV 12.8 HV 14.3 HV 15.7 HV 17.1 HV 18.6 HV 20.1 HV 21.7 HV 0.4 HV 0.9 HV 1.5 HV 2.1 HV 2.8 HV 3.6 HV 4.4 HV 5.2 HV 6.1 HV 7.0 HV 8.0 HV 9.0 HV 10.0 HV		P

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Vickers Reference Hardness Blocks (cont'd)	Vickers Scales: 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 11.0 HV 12.1 HV 13.2 HV 14.3 HV 15.5 HV 16.7 HV		P
Certification of reference Vickers hardness measurements & Vickers Reading Blocks	All ranges See note 2	1.0 μm		P
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 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 0.1 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	See note 8 9.6 HK 21.2 HK 7.1 HK 18.5 HK 33.2 HK 42.4 HK 5.2 HK 13.2 HK 23.1 HK 34.4 HK 46.3 HK 60.3 HK 74.9 HK 92.3 HK 106.1 HK 4.3 HK 10.5 HK 17.8 HK 26.4 HK 36.2 HK 46.2 HK 57.5 HK 68.9 HK 80.3 HK 94.6 HK 3.6 HK 8.5 HK 14.3 HK 20.9 HK 28.0 HK 35.6 HK 43.8 HK 52.8 HK 61.9 HK 71.3 HK	Note 8 The calibration shall be in accordance with the requirements of BS EN ISO 4545-3:2017, ASTM E384-17 and ASTM E92-17	P

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Knoop hardness reference blocks (cont'd)	Knoop Scales 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 HK 0.3 35 to 100 HK 0.3 100 to 200 HK 0.3 200 to 300 HK 0.3 300 to 400 HK 0.3 400 to 500 HK 0.3 500 to 600 HK 0.3 600 to 700 HK 0.3 700 to 800 HK 0.3 800 to 900 HK 0.3 900 to 1000 HK 0.5 35 to 100 HK 0.5 100 to 200 HK 0.5 200 to 300 HK 0.5 300 to 400 HK 0.5 400 to 500 HK 0.5 500 to 600 HK 0.5 600 to 700 HK 0.5 700 to 800 HK 0.5 800 to 900 HK 0.5 900 to 1000 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	See Note 8 3.1 HK 7.1 HK 11.7 HK 17.0 HK 22.6 HK 28.7 HK 34.9 HK 41.8 HK 48.9 HK 56.0 HK 3.1 HK 6.5 HK 10.6 HK 15.2 HK 20.1 HK 25.4 HK 31.0 HK 36.9 HK 43.0 HK 49.5 HK 2.6 HK 5.8 HK 9.5 HK 13.5 HK 17.8 HK 22.1 HK 26.8 HK 31.7 HK 36.9 HK 42.8 HK 2.4 HK 5.2 HK 8.3 HK 11.6 HK 15.2 HK 18.9 HK 22.7 HK 26.6 HK 30.9 HK 35.6 HK		P
Certification of reference Knoop hardness measurements & Knoop Reading Blocks	All ranges See note 8	1.0 μm		P

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Brinell Reference Hardness Blocks	Brinell Scales: Force diameter index (F/D^2) = 30 10/3000 600HBW to 650 HBW 10/3000 500HBW to 600 HBW 10/3000 400HBW to 500 HBW 10/3000 300HBW to 400 HBW 10/3000 200HBW to 300 HBW 10/3000 95HBW to 200 HBW 5/750 600HBW to 650 HBW 5/750 500HBW to 600 HBW 5/750 400HBW to 500 HBW 5/750 300HBW to 400 HBW 5/750 200HBW to 300 HBW 5/750 95HBW to 200 HBW 2.5/187.5 600HBW to 650 HBW 2.5/187.5 500HBW to 600 HBW 2.5/187.5 400HBW to 500 HBW 2.5/187.5 300HBW to 400 HBW 2.5/187.5 200HBW to 300 HBW 2.5/187.5 95HBW to 200 HBW 1/30 600HBW to 650 HBW 1/30 500HBW to 600 HBW 1/30 400HBW to 500 HBW 1/30 300HBW to 400 HBW 1/30 200HBW to 300 HBW 1/30 95HBW to 200 HBW	See Note 9 4.3 HBW 4.0 HBW 3.3 HBW 2.7 HBW 2.0 HBW 1.4 HBW 5.3 HBW 4.9 HBW 4.1 HBW 3.3 HBW 2.5 HBW 1.7 HBW 5.3 HBW 4.9 HBW 4.1 HBW 3.3 HBW 2.1 HBW 1.7 HBW 6.0 HBW 5.5 HBW 4.4 HBW 3.4 HBW 2.5 HBW 1.7 HBW	9 The calibration / verification shall be in accordance with the requirements of BS EN ISO 6506-3:2014 and /or ASTM E10-18	P

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
	Force diameter index (F/D^2) = 15 10/1500 270HBW to 300HBW 10/1500 230HBW to 270HBW 10/1500 200HBW to 230HBW 10/1500 170HBW to 200HBW 10/1500 140HBW to 170HBW 10/1500 110HBW to 140HBW 10/1500 70HBW to 110HBW 10/1500 55HBW to 70HBW	2.0 HBW 1.8 HBW 1.5 HBW 1.3 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW		
	Force diameter index (F/D^2) = 10 10/1000 200HBW to 218 HBW 10/1000 170HBW to 200 HBW 10/1000 140 HBW to 170 HBW 10/1000 110HBW to 140HBW 10/1000 90HBW to 110HBW 10/1000 55HBW to 90HBW	1.4 HBW 1.3 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW		
	5/250 200HBW to 218HBW 5/250 170HBW to 200HBW 5/250 140 HBW to 170HBW 5/250 110HBW to 140HBW 5/250 90HBW to 110HBW 5/250 55HBW to 90HBW	1.9 HBW 1.7 HBW 1.5 HBW 1.2 HBW 1.1 HBW 1.1 HBW		

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
Calibration of Brinell Reference Hardness Blocks (cont'd)	Brinell Scales: Force diameter index (F/D^2) = 30 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 Force diameter index(F/D^2) = 5 10/500 100 HBW to 109 HBW 10/500 70 HBW to 100 HBW 10/500 47 HBW to 70 HBW 5/125 100 HBW to 109 HBW 5/125 70 HBW to 100 HBW 5/125 47 HBW to 70 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 Force diameter index (F/D^2) = 2.5 10/250 20HBW to 55HBW 5/62.5 20.0HBW to 55.0HBW 2.5/15.625 20.0HBW to 55.0HBW 1/2.5 20.0HBW to 55.0HBW Force diameter index (F/D^2) = 1.25 10/125 20HBW	See Note 9 1.8 HBW 1.7 HBW 1.1 HBW 2.0 HBW 1.8 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW		P

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks	Location Code
	5/31.25 20HBW 2.5/7.8125 20HBW Force diameter index (F/D^2) = 1 10/100 20HBW 5/25 20HBW 2.5/6.25 20HBW 1/1 20HBW	1.1 HBW 1.1 HBW 1.1 HBW 1.1 HBW 1.1HBW 1.1 HBW		
Certification of reference Brinell hardness measurements & Brinell Reading Blocks	All ranges See note 3	1.0 μm		P
END				

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: $Q[a, b] = [a^2 + b^2]^{1/2}$