


# Schedule of Accreditation

issued by

## United Kingdom Accreditation Service

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

 <p><b>UKAS</b> CALIBRATION</p> <p>0167</p> <p>Accredited to ISO/IEC 17025:2017</p>	<p><b>ZwickRoell Limited</b> also trading as <b>Sercal Materials Testing Machines</b> also trading as <b>UK Calibrations</b></p> <p>Issue No: 057    Issue date: 08 August 2025</p>	
	<p>Worcester Six Business Park Clayfield Road Worcester Worcestershire WR4 0AE</p>	<p>Contact: Benno Sadowski Tel: +44 (0)1568 615201/2 Fax: +44 (0)1568 612626 E-Mail: <a href="mailto:laboratory@zwickroell.com">laboratory@zwickroell.com</a> Website: <a href="http://www.zwickroell.com">www.zwickroell.com</a></p>
<p>Calibration performed by the Organisations at the locations specified below</p>		

### Locations covered by the organisation and their relevant activities

#### Laboratory locations:

Location details	Activity	Location code
<p><b>Address</b> Worcester Six Business Park Clayfield Road Worcester Worcestershire WR4 0AE</p> <p><b>Contact:</b> Benno Sadowski</p>	Force	P

#### Site activities performed away from the locations listed above:

Location details	Activity	Location code
<p>Any customer's sites or premises must be suitable for the nature of the particular calibrations undertaken and will be the subject of contract review arrangements between laboratory and the customer.</p> <p><b>Contact:</b> Benno Sadowski</p>	Force Hardness	S



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Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code
FORCE				S
UNIVERSAL TESTING MACHINES				
Verification and calibration of the force measuring system by force proving instruments in tension	2 N to 1200 kN For Class 0.5, 1, 2 and 3 machines to BS EN ISO 7500- 1:2018	0.20 %		
	2 N to 3000 kN For Class 1, 2 and 3 machines to BS EN ISO 7500-1:2018 and ASTM E4-24	0.29 %		
Verification and calibration of the force measuring system by force proving instruments in compression	5 N to 600 kN for Class 0.5, 1, 2 and 3 machines to BS EN ISO 7500- 1:2018	0.20 %		
	5 N to 16.5 MN for Class 1, 2 and 3 machines to BS EN ISO 7500-1:2018 and ASTM E4-24	0.29 %		
Verification and calibration of the force measuring system by calibrated masses in tension	0.01 N to 100 N for Class 0.5, 1, 2 and 3 machine to BS EN ISO 7500-1:2018 and ASTM E4-24	0.10 %		
Verification and calibration of the force measuring system by calibrated masses in compression	0.01 N to 100 N for Class 0.5, 1, 2 and 3 machines to BS EN ISO 7500-1:2018 and ASTM E4-24	0.10 %		
CREEP TESTING MACHINES				S
Verification of the applied load using force proving instruments	2 N to 500 kN For Class 0.5, 1 and 2 machines to BS EN ISO 7500-2:2006	0.20 %		
Verification of the applied load using masses	0.01 N to 500 N For Class 0.5, 1 and 2 machines to BS EN ISO 7500-2:2006	0.10 %		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code
<p>FORCE (cont'd)</p> <p>FORCE MEASURING DEVICES</p> <p>Calibration of force measuring devices e.g. load cells and load measuring rings but excluding proving devices. Tension and compression.</p> <p>COMPRESSION TESTING MACHINES FOR CONCRETE</p> <p>Verification of concrete testing machines by proving devices in Compression</p> <p>Rate of application of force (Pacer rate)</p> <p>Flatness of platens and spacing blocks, and excluding the requirements of platen hardness and surface finish</p>	<p>1 N to 1000 N 100 N to 500 kN</p> <p>100 kN to 16.5 MN for Class 1, 2 and 3 machines to BS EN ISO 7500-1:2018</p> <p>As BS EN 12390-2:2019 3 kN/min to 1300 kN/min</p> <p>As BS EN 12390-4:2019 40 mm to 300 mm</p>	<p>0.10 % 0.41 %</p> <p>0.32 % See note 1</p> <p>1.2 %</p> <p>0.010 mm</p>		<p>P</p> <p>S</p>
<p>EXTENSOMETRY</p> <p>Extensometers</p>	<p>As BS EN ISO 9513:2012 for the following classes and gauge lengths:</p> <p>Class 0.2 from 25 mm Class 0.5 from 10 mm Class 1 from 5 mm Class 2 from 5 mm</p> <p>As ASTM E83-16 for the following classes and gauge lengths:</p> <p>A from 50 mm B-1 from 20 mm B-2 from 10 mm C from 5 mm</p> <p>Displacements 0.005 mm to 50 mm</p> <p>As BS ISO 5893:2002 Grades C, D and E</p> <p>Displacements From 3 mm to 600 mm</p>	<p>2.4 <math>\mu</math>m per mm</p> <p>0.04 mm + (0.19 mm per m)</p>		S



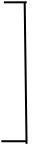
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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code
EXTENSOMETRY (cont'd)  Testing Machine Cross head/ Actuator displacement  Testing Machine Cross head/ Actuator speed  Displacement transducers used with materials testing machines	1 mm to 1200 mm  30 seconds to 10 minutes  0.10 mm to 25 mm	0.011 mm + (0.13 mm per m)  0.15 s  0.26 $\mu$ m + (0.85 $\mu$ m per mm)		
TORSION TESTING MACHINES  Torque  Angle	4 N.m to 5000 N.m  $0^\circ$ to $360^\circ$	0.43 %  0.25 $^\circ$		S
IMPACT TESTING MACHINES  Charpy  Izod  Plastics	Absorbed Energy (joules) 1 J to 600 J BS EN ISO 148-2:2016 ASTM E23-24  BS 131:Part 4:1972  BS ISO 13082:2015	  0.11J		S
CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE  Direct verification of Vickers & Knoop hardness testing machines	Vickers and Knoop scales: HV 5 to HV 100 HV 0.1 to HV 5 HV 0.025 to HV 0.05 HK 0.025 to HK 2  Force  Time  Length	See note 3  0.24%  0.10 second  0.50 $\mu$ m	NOTES  1 The calibration/ verification shall be in accordance with the requirements of BS EN ISO 6508-2:2023 & ASTM E18-24.  2 The calibration/ verification shall be in accordance with the requirements of BS EN ISO 6506-2:2018, ASTM E10-23.  3 The verification shall be in accordance with the requirements of BS EN ISO 6507-2:2018, ASTM E92-23 & ASTM E384-17. and BS EN ISO 4545-2:2017.	S



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code
CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				S
Indirect verification of Vickers & Knoop hardness testing machines & indentation measuring devices	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  HV2.5 200 HV2.5 400 HV2.5 700  HV2 200 HV2 400 HV2 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 3 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  6.0 HV 12.6 HV 25.3 HV  6.7 HV 14.0 HV 29.7 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		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code
CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				S
Indirect verification of Vickers & Knoop hardness testing machines & indentation measuring devices (cont'd)	Vickers scales: HV 0.1 200 HV 0.1 400 HV 0.1 700  HV 0.05 80 HV 0.05 115  HV 0.025 100 HV 0.025 200  Knoop scales: HK1 200 HK1 400 HK1 700  HK 0.5 200 HK 0.5 400 HK 0.5 700  HK 0.3 200 HK 0.3 400 HK 0.3 700  HK 0.2 200 HK 0.2 400 HK 0.2 700  HK 0.1 200 HK 0.1 400 HK 0.1 700  HK 0.05 200 HK 0.05 400 HK 0.05 700  HK 0.025 200 HK 0.025 400 HK 0.025 700	See note 3 10.0 HV 30.0 HV 40.0 HV  11.5 HV 11.5 HV  19.0 HV 19.0 HV  See note 3 9.1 HK 16.7 HK 29.2 HK  10.5 HK 19.5 HK 34.8 HK  11.7 HK 22.1 HK 40.5 HK  12.8 HK 24.8 HK 45.9 HK  15.7 HK 30.8 HK 58.0 HK  7.0 HK 19.0 HK 44.0 HK  9.5 HK 27.0 HK 62.5 HK		
Direct verification of Brinell hardness testing machines	Brinell scales: From HB 10/3000 to HB 1/30 Force  Time  Length	See note 2  0.24% force  0.1 second time  10 $\mu$ m		



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CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				S
Indirect verification of Brinell hardness testing machines	Scale 10/3000 600HBW to 140 HBW	See Note 2 8.0 HBW to 2.2 HBW		
	Scale 10/1500 299 HBW to 55 HBW	4.1 HBW to 1.2 HBW		
	Scale 10/1000 169 HBW to 55 HBW	2.3 HBW to 1.2 HBW		
	Scale 10/500 100 HBW to 200 HBW	1.71 HBW		
	Scale 5/750 600 HBW to 140 HBW	9.8 HBW to 2.4 HBW		
	Scale 5/250 169 HBW to 55 HBW	2.7 HBW to 1.3 HBW		
	Scale 2.5/187.5 600 HBW to 140 HBW	16 HBW to 2.9 HBW		
	Scale 2.5/62.5 169 HBW to 55 HBW	10 HBW to 2.3 HBW		
	Scale 1/30 600 HBW to 96 HBW	31.6 HBW to 2.9 HBW		
	Scale 1/10 141 HBW	3.6 HBW		
	Scale 1/1 21.8 HBW to 3.18 HBW	1.04 HBW to 0.09 HBW		
Direct verification of Rockwell hardness testing machines	Rockwell scales: A, B, C, D, E, F, G, H, K,L,M,P,R,S,V, N,T,W,X & Y Force	See note 1  0.24%		
	Length	0.40 $\mu$ m		
Indirect verification of Rockwell hardness testing machines	Rockwell scales: HRA Scale 80 to 88 70 to 75 20 to 40	See note 1  0.15 HRA 0.16 HRA 0.28 HRA		



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CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				S
Indirect verification of Rockwell hardness testing machines (cont'd)	Rockwell scales:	See Note 1		
	HRB Scale			
	80	0.42 HRB		
	51 to 79	0.87 HRB		
	10 to 50	1.36 HRB		
	HRC Scale			
	60 to 70	0.31 HRC		
	40 to 59	0.32 HRC		
	20 to 39	0.37 HRC		
	HRD Scale			
	70 to 80	0.17 HRD		
	50 to 69	0.25 HRD		
	40 to 49	0.27 HRD		
	HRE Scale			
	89	0.54 HRE		
	75 to 88	0.54 HRE		
	65 to 87	0.54 HRE		
	HRF Scale			
	87	0.40 HRF		
	70 to 86	0.40 HRF		
	40 to 69	0.54 HRF		
	HRG Scale			
	80	0.30 HRG		
	40 to 79	0.30 HRG		
	10 to 39	0.76 HRG		
	HRH Scale			
	90	0.40 HRH		
	80 to 89	0.40 HRH		
	60 to 79	0.68 HRH		
	HRK Scale			
	70	0.40 HRK		
	30to69	0.40 HRK		
	10to29	0.64 HRK		
	HRL Scale			
	115	0.35 HRL		
	90 to 114	0.35 HRL		
	HRM Scale			
	100	0.56 HRM		
	70 to 99	0.56 HRM		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code
CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				S
Indirect verification of Rockwell hardness testing machines (cont'd)	Rockwell Scales: HRP Scale 85 40 to 84	See Note 1 0.65 HRP 0.91 HRP		
	HRR Scale 120 100 to 119	0.23 HRR 0.40 HRR		
	HRS Scale 112 110 to 111	0.19 HRS 0.91 HRS		
	HRV Scale 104 80 to 103	0.20 HRV 0.61 HRV		
	HR15N Scale 90to95 80to89 40to79	0.18 HR15N 0.18 HR15N 0.39 HR15N		
	HR15T Scale 88 to 100 80 to 87 20 to 79	0.21 HR15T 0.21 HT15T 0.37 HR15T		
	HR15W Scale 89 to 100 80 to 88	0.53 HR15W 0.44 HR15W		
	HR15X Scale 88 to 100 80 to 87	0.33 HR15X 0.62 HR15X		
	HR15Y Scale 94 to 100 85 to 93	0.63 HR15Y 1.30 HR15Y		
	HR30N Scale 77 to 85 60 to 76 40 to 59	0.27 HR30N 0.27 HR30N 0.55 HR30N		
	HR30T Scale 57 to 85 50 to 56 20 to 49	0.39 HR30T 0.66 HR30T 0.90 HR30T		
	HR30W Scale 65 to 100 40 to 64	0.76 HR30W 0.90 HR30W		



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Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( $k = 2$ )	Remarks	Location Code
CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				S
Indirect verification of Rockwell hardness testing machines (cont'd)	Rockwell Scales: HR30X Scale 79 to 100 60 to 78	See Note 1 0.15 HR30X 0.99 HR30X		
	HR30Y Scale 88 to 100 60 to 87	0.37 HR30Y 0.82 HR30Y		
	HR45N Scale 67 to 75 50 to 66 10 to 49	0.18 HR45N 0.21 HR45N 0.43 HR45N		
	HR45T Scale 50 to 75 40 to 49 10 to 39	0.40 HR45T 0.40 HR45T 0.73 HR45T		
	HR45W Scale 49 to 100 10 to 47	0.12 HR45W 0.29 HR45W		
	HR45X Scale 69 to 100 40 to 68	0.34 HR45X 0.81 HR45X		
	HR45Y Scale 82 to 100 60 to 81	0.29 HR45Y 0.94 HR45Y		
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:  $Q[a, b] = [a^2 + b^2]^{1/2}$