


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 0167 Accredited to ISO/IEC 17025:2017	ZwickRoell Limited also trading as Sercal Materials Testing Machines also trading as UK Calibrations Issue No: 056 Issue date: 02 June 2025	
	Worcester Six Business Park Clayfield Road Worcester Worcestershire WR4 0AE	Contact: Dr Nigel Wrigley Tel: +44 (0)1568 615201/2 Fax: +44 (0)1568 612626 E-Mail: laboratory@zwickroell.com Website: www.zwickroell.com

Calibration performed by the Organisations at the locations specified below

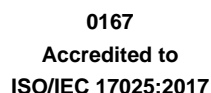
Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code
Address Worcester Six Business Park Clayfield Road Worcester Worcestershire WR4 0AE Contact: Dr Nigel Wrigley	Force	P

Site activities performed away from the locations listed above:

Location details	Activity	Location code
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. Contact: Dr Nigel Wrigley	Force Hardness	S



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Calibration and Measurement Capability (CMC)

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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 μm per mm</p> <p>0.04 mm + (0.19 mm per m)</p>		S



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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 μ m + (0.85 μ m per mm)		
TORSION TESTING MACHINES Torque Angle	4 N.m to 5000 N.m 0° to 360°	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	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; height: 40px; margin-right: 10px;"></div> <div style="text-align: center;">0.70 J</div> </div> 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 μ 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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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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<p>CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)</p> <p>Indirect verification of Vickers & Knoop hardness testing machines & indentation measuring devices (cont'd)</p>	<p>Vickers scales:</p> <p>HV 0.1 200 HV 0.1 400 HV 0.1 700</p> <p>HV 0.05 80 HV 0.05 115</p> <p>HV 0.025 100 HV 0.025 200</p> <p>Knoop scales:</p> <p>HK1 200 HK1 400 HK1 700</p> <p>HK 0.5 200 HK 0.5 400 HK 0.5 700</p> <p>HK 0.3 200 HK 0.3 400 HK 0.3 700</p> <p>HK 0.2 200 HK 0.2 400 HK 0.2 700</p> <p>HK 0.1 200 HK 0.1 400 HK 0.1 700</p> <p>HK 0.05 200 HK 0.05 400 HK 0.05 700</p> <p>HK 0.025 200 HK 0.025 400 HK 0.025 700</p> <p>Brinell scales:</p> <p>From HB 10/3000 to HB 1/30 Force</p> <p>Time</p> <p>Length</p>	<p>See note 3</p> <p>10.0 HV 30.0 HV 40.0 HV</p> <p>11.5 HV 11.5 HV</p> <p>19.0 HV 19.0 HV</p> <p>See note 3</p> <p>9.1 HK 16.7 HK 29.2 HK</p> <p>10.5 HK 19.5 HK 34.8 HK</p> <p>11.7 HK 22.1 HK 40.5 HK</p> <p>12.8 HK 24.8 HK 45.9 HK</p> <p>15.7 HK 30.8 HK 58.0 HK</p> <p>7.0 HK 19.0 HK 44.0 HK</p> <p>9.5 HK 27.0 HK 62.5 HK</p> <p>See note 2</p> <p>0.24% force</p> <p>0.1 second time</p> <p>10 μm</p>		S



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CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				S
Indirect verification of Brinell hardness testing machines	Scale 10/3000 600 HBW 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 μm		
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) Indirect verification of Rockwell hardness testing machines (cont'd)				S
	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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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 HRR Scale 120 100 to 119 HRS Scale 112 110 to 111 HRV Scale 104 80 to 103 HR15N Scale 90to95 80to89 40to79 HR15T Scale 88 to 100 80 to 87 20 to 79 HR15W Scale 89 to 100 80 to 88 HR15X Scale 88 to 100 80 to 87 HR15Y Scale 94 to 100 85 to 93 HR30N Scale 77 to 85 60 to 76 40 to 59 HR30T Scale 57 to 85 50 to 56 20 to 49 HR30W Scale 65 to 100 40 to 64	See Note 1 0.65 HRP 0.91 HRP 0.23 HRR 0.40 HRR 0.19 HRS 0.91 HRS 0.20 HRV 0.61 HRV 0.18 HR15N 0.18 HR15N 0.39 HR15N 0.21 HR15T 0.21 HT15T 0.37 HR15T 0.53 HR15W 0.44 HR15W 0.33 HR15X 0.62 HR15X 0.63 HR15Y 1.30 HR15Y 0.27 HR30N 0.27 HR30N 0.55 HR30N 0.39 HR30T 0.66 HR30T 0.90 HR30T 0.76 HR30W 0.90 HR30W		



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