

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 0252 Accredited to ISO/IEC 17025:2017	R&H Testing Services Ltd Issue No: 056 Issue date: 04 April 2022	
	Unit 7 Cannel Road Chase Terrace Burntwood Business Park Burntwood Staffordshire WS7 3FU	Contact: Mr R J Chamberlain Tel: +44 (0)1543 677400 Fax: +44 (0)1543 677477 E-Mail: sales@randhtesting.com Website: www.randhtesting.com

Calibration performed by the Organisations at the locations specified below

Locations covered by the organisation and their relevant activities

Site activities performed away from the locations listed above:

Location details	Activity	Location code
Any customer's premises Contact: Mr R J Chamberlain	Force Extensometry Displacement and speed Hardness Impact	Site



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Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
FORCE				Site
UNIVERSAL MATERIALS TESTING MACHINES				
Verification and calibration of the force measuring system by force proving instruments in tension	From 0.02 kN up to 1080 kN for Class 0.5, 1, 2 and 3 machines to BS EN ISO 7500-1:2018	0.26 %		
	From 0.02 kN up to 3000 kN for Class 1, 2 and 3 machines to BS EN ISO 7500-1:2018 and ASTM E4-21	0.33 %		
Verification and calibration of the force measuring system by force proving instruments in compression	From 0.02 kN up to 1080 kN for Class 0.5, 1, 2, and 3 machines to BS EN ISO 7500-1:2018	0.26 %		
	From 0.02 kN up to 3000 kN for Class 1, 2 and 3 machines to BS EN ISO 7500-1:2018 and ASTM E4-21	0.33 %		
Verification and calibration of the force measuring system by calibrated masses in tension and compression	From 0.01 N up to 50 N for Class 0.5, 1, 2 and 3 machines to BS EN ISO 7500-1: 2018 and ASTM E4-21	0.10 %		
TENSION CREEP TESTING MACHINES				
Verification of the applied load using force proving instruments	From 0.02 kN up to 500 kN for Class 0.5, 1.0 and 2.0 machines to BS EN ISO 7500-2:2006	0.26 %		
Verification of the applied load using masses	From 0.01 N up to 50 N for Class 0.5, 1.0 and 2.0 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
IMPACT TESTING MACHINES				All Site
Metal Impact testing machines Charpy -	ISO 148-2:2016 ASTM E23-18 but excluding proof test using certified specimens.	0.65 J		
Izod -	BS 131:Part 4:1972			
Plastic impact testing machines Charpy, Izod -	ISO 13802:2015	0.10 J		
LENGTH				
Extensometers	As BS EN ISO 9513:2012 for the following classes and gauge lengths: Class 0.2 from 25 mm Class 0.5 from 10 mm Class 1 from 5 mm Class 2 from 5 mm Displacements 0.01 mm to 0.50 mm 0.50 mm to 1.0 mm 1.01 mm to 2.5 mm 2.5 mm to 10 mm 10 mm to 50 mm As ASTM E83-16 for the following classes and gauge lengths: B-1 from 20 mm B-2 from 10 mm C from 5 mm Displacements 0.01 mm to 0.5 mm 0.50 mm to 1.0 mm 1.0 mm to 2.5 mm 2.5 mm to 10 mm 10 mm to 50 mm	0.86 μ m 1.0 μ m 1.4 μ m 7.1 μ m 21 μ m		
Testing machine crosshead displacement	2 mm to 100 mm 100 mm to 500 mm 500 mm to 1000 mm	0.03 mm 0.14 mm 0.30 mm		
Extensometers, Long travel	As BS ISO 5893:2019+A1:2020 for classes C, D and E			



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Displacement	2 mm to 100 mm 100 mm to 1000 mm	0.03 mm 0.30 mm		
Speed	As BS ISO 5893:2019+a1:2020 1 mm/min to 50 mm/min 50 mm/min to 500 mm/min	1.1% 0.32%		
CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE				
Direct verification of Vickers hardness testing machines	Vickers scales: HV 5 to HV 100 HV 0.2 to HV 1 Force 49.03 N to 980.7 N 1.961 N to 9.807 N Time 1 s to 15 s Length 0.01 mm 1 mm	See note 1 0.24% 0.24 % 0.17 second	Note 1 The verification shall be in accordance with the requirements of BS EN ISO 6507-2:2018, or ASTM E92:17 & ASTM E384-17	
Indirect verification of Vickers hardness 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	See Note 1 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		



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CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				
Indirect verification of Vickers hardness testing machines (cont'd)	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 HV 0.1 200 HV 0.1 400 HV 0.1 700	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 10.0 HV 30.0 HV 40.0 HV		
Direct verification of Brinell hardness testing machines	Brinell scales: From HB 10/3000 to HB 1/30 Force 294.2 N to 29.42 kN Time 1 s to 15 s Length 0.24 mm to 6 mm	See Note 2 0.24% 0.17 s 10 μ m	Note 2 The calibration/ verification shall be in accordance with the requirements of BS EN ISO 6506-2:2018 & or ASTM E10-18	
Indirect verification of Brinell hardness 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 Scale 2.5/187.5 600 HBW to 140 HBW Scale 1/30 350 HBW to 140 HBW Scale 1/1 21.8 HBW to 3.18 HBW	See Note 2 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 16 HBW to 2.9 HBW 2.5 HBW to 0.70 HBW 1.04 HBW to 0.09 HBW		



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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)				
Direct verification of Rockwell hardness testing machines	Rockwell scales: A, B, C, D, E, F, G, H, K, N & T	See Note 3	Note 3 The calibration/ verification shall be in accordance with the requirements of BS EN ISO 6508-2:2015, & or ASTM E18-20	
	Force 29.42 N to 1471 N	0.24%		
	Time 1 s to 15 s	0.17 s		
	Depth 0.01 μm to 260 μm	0.10 μm		
Indirect verification of Rockwell hardness testing machines	Rockwell scales:	See Note 3		
	HRA Scale 86 to 85 70 to 79 60 to 69	0.15 HRA 0.16 HRA 0.28 HRA		
	HRB Scale 80 51 to 79 10 to 50	0.42 HRB 0.87 HRB 1.36 HRB		
	HRC Scale 60 to 70 40 to 59 20 to 39	0.31 HRC 0.32 HRC 0.37 HRC		
	HRD Scale 70 to 80 50 to 69 40 to 49	0.17 HRD 0.25 HRD 0.27 HRD		
	HRE Scale 89 75 to 88 65 to 87	0.54 HRE 0.54 HRE 0.54 HRE		
	HRF Scale 87 70 to 86 40 to 69	0.40 HRF 0.40 HRF 0.54 HRF		
	HRG Scale 80 40 to 79 10 to 39	0.30 HRG 0.30 HRG 0.76 HRG		
	HRH Scale 90 80 to 89 60 to 79	0.40 HRH 0.40 HRH 0.68 HRH		



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CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				
Indirect verification of Rockwell hardness testing machines (cont'd)	HRK Scale 70 30 to 69 10 to 29	0.40 HRK 0.40 HRK 0.64 HRK		
	HRL Scale 115 90 to 114	0.35 HRL 0.35 HRL		
	HRM Scale 100 70 to 99	0.56 HRM 0.56 HRM		
	HRP Scale 85 40 to 84	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 to 81 80 to 103	0.20 HRV 0.61 HRV		
	HR15N Scale 90 to 95 80 to 89 40 to 79	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		



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CERTIFICATION OF HARDNESS TESTING MACHINES IN SERVICE (cont'd)				
Indirect verification of Rockwell hardness testing machines (cont'd)	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		
	HR30X Scale 79 to 100 60 to 78	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: $Q[a, b] = [a^2 + b^2]^{1/2}$