


Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

 0649 Accredited to ISO/IEC 17025:2017	Paragon Scientific Ltd Issue No: 054 Issue date: 04 November 2024	
	6 Prenton Way North Cheshire Trading Estate Prenton Wirral CH43 3DU	Contact: Dr J Roberts Tel: +44 (0)151 649 9955 E-Mail: paragon.sales@lgcgroup.com Website: www.lgcstandards.com/Paragon_Scientific
Calibration performed at the above address only		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details		Activity	Location code
Address 6 Prenton Way North Cheshire Trading Estate Prenton Wirral CH43 3DU	Local contact Dr J Roberts	Calibration: Optical Viscosity Density Flash point Acid Number Base Number Sulfur Content pH Measurement Colour	Prenton



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Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ($k = 2$)	Remarks	Location Code
OPTICAL				Prenton
Sucrose solutions for use as refractive index calibration standards	Sucrose in water wt/wt 0 % to 60 % Corresponding to refractive index values of 1.332986 to 1.441928	0.011 % wt/wt 0.000016 to 0.000025	Calibrated against mass reference. Equivalent to 0 °Brix to 60 °Brix Calculated from ICUMSA Specification and Standard SPS-3 (2000)	
Refractive Index				
Calibration liquids	1.33 to 1.65	0.00007	Measurement at 15 °C, 20 °C, 25 °C and 30 °C Using a refractometer.	
VISCOSITY				
Capillary Viscometer Calibration				
Viscosity Constant •C•	•C• (mm ² s ⁻¹)s ⁻¹			
Master viscometers – Ubbelohde	0.001 0.002 0.005 0.013 0.03 0.08 0.2 0.5 1.2 3 8.8 22 58	0.050 % 0.060 % 0.080 % 0.11 % 0.13 % 0.15 % 0.17 % 0.19 % 0.21 % 0.23 % 0.25 % 0.27 % 0.29 %	Calibrated to ASTM 2162	
Viscosity Constant •C•	•C• (mm ² s ⁻¹)s ⁻¹			
Reference viscometers, Ubbelohde suspended level	0.001 0.003 0.005 0.01 0.03 0.05 0.1 0.3 0.5 1 3 5 10 30 100	0.13 % 0.13 % 0.13 % 0.14 % 0.16 % 0.16 % 0.17 % 0.19 % 0.20 % 0.22 % 0.23 % 0.23 % 0.24 % 0.27 % 0.27 %	Calibrated to ASTM D446 in direct comparison with master viscometers calibrated to ASTM D2162	



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Measured Quantity Instrument or Gauge	Range		Expanded Measurement Uncertainty (<i>k</i> = 2)		Remarks	Location Code
VISCOSITY (continued)					Calibrated to ASTM D446 using viscosity standards calibrated to ASTM D2162	P r e n t o n
Viscosity Constant •C•	•C• (mm ² s ⁻¹)s ⁻¹					
Working viscometers	(a)	(b)	(a)	(b)		
(a) Direct flow - suspended level	0.001	0.002	0.17 %	0.25 %		
(b) Reverse flow	0.003	0.004	0.17 %	0.25 %		
	0.005	0.008	0.17 %	0.25 %		
	0.01	0.015	0.17 %	0.26 %		
	0.03	0.035	0.18 %	0.28 %		
	0.05	0.1	0.21 %	0.29 %		
	0.1	0.25	0.22 %	0.31 %		
	0.3	0.5	0.25 %	0.33 %		
	0.5	1.2	0.26 %	0.34 %		
	1	2.5	0.28 %	0.35 %		
	3	8	0.30 %	0.38 %		
	5	20	0.31 %	0.40 %		
	10	30	0.33 %	0.40 %		
	30		0.35 %			
	50		0.36 %			
(a) Direct flow - suspended level	(a)	(b)	(a)	(b)	Calibrated to ASTM D 446 using viscosity standards calibrated / traceable to ASTM D 2162	
	100	100	0.48 %	0.52 %		
		300		0.52 %		
Viscosity Measurement					Viscosity reference standards calibrated to ASTM D2162 Viscosity values at intermediate temperatures can be determined in accordance with ASTM D341 Viscosity index can be calculated in accordance with ASTM D2270	
Kinematic and Dynamic Viscosity 15 °C to 100 °C	mm ² s ⁻¹		Kinematic	Dynamic		
	0.3 to 3		0.080 %	0.080 %		
	3 to 7.4		0.080 %	0.080 %		
	7.4 to 10		0.10 %	0.10 %		
	10 to 30		0.13 %	0.13 %		
	30 to 72		0.15 %	0.15 %		
	72 to 180		0.17 %	0.17 %		
	180 to 520		0.19 %	0.19 %		
	520 to 1000		0.21 %	0.21 %		
	1000 to 2700		0.23 %	0.23 %		
	2700 to 8000		0.25 %	0.25 %		
	8000 to 13000		0.27 %	0.27 %		
	13000 to 65000		0.29 %	0.29 %		
	65000 to 174000		0.30 %	0.30 %		



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VISCOSITY (continued)					Penton
Viscosity Measurement (continued)					
Kinematic and Dynamic Viscosity 20 °C to 100 °C	mm ² s ⁻¹	Kinematic	Dynamic	Viscosity reference standards calibrated to ASTM D445	
	0.3 to 3	0.29 %	0.29 %		
	3 to 10	0.30 %	0.30 %		
	10 to 50	0.32 %	0.32 %	Viscosity values at intermediate temperatures can be determined in accordance with ASTM D341	
	50 to 100	0.33 %	0.33 %		
	100 to 500	0.35 %	0.35 %		
	500 to 1000	0.36 %	0.36 %		
	1000 to 5000	0.37 %	0.37 %		
	5000 to 10000	0.38 %	0.38 %	Viscosity index can be calculated in accordance with ASTM D2270	
	10000 to 125 000	0.40 %	0.40 %		
Kinematic and Dynamic Viscosity 20 °C to -40 °C	mm ² s ⁻¹	Kinematic	Dynamic	Viscosity reference standards calibrated to ASTM D445	
	0.6 to 2	0.38 %	0.38 %		
	2 to 8	0.39 %	0.39 %		
	8 to 200	0.40 %	0.40 %	For use with, but not limited to low temperature viscosity and ASTM D5293	
	200 to 400	0.41 %	0.41 %		
	400 to 800	0.42 %	0.42 %		
	800 to 2000	0.43 %	0.43 %		
	2000 to 4000	0.46 %	0.46 %	Viscosity values at intermediate temperatures can be determined in accordance with ASTM D341	
	4000 to 8000	0.47 %	0.47 %		
	8000 to 40000	0.49 %	0.49 %		
	40000 to 200 000	0.59 %	0.59 %		
Kinematic and Dynamic Viscosity 100 °C to 150 °C	mm ² s ⁻¹	Kinematic	Dynamic	Viscosity reference standards calibrated to ASTM D445	Penton
	0.3 to 4	0.32 %	0.32 %		
	4 to 8	0.33 %	0.33 %		
	8 to 80	0.34 %	0.34 %	Viscosity values at intermediate temperatures can be determined in accordance with ASTM D341	
	80 to 200	0.35 %	0.35 %		
	200 to 400	0.36 %	0.36 %		
	400 to 1000	0.37 %	0.37 %		
Kinematic and Dynamic Viscosity 20 °C to 150 °C	mm ² s ⁻¹	Kinematic	Dynamic	Viscosity Silicon oil reference standards calibrated to ASTM D445	
	2 to 8	0.40 %	0.40 %		
	8 to 80	0.41 %	0.41 %		
	80 to 400	0.42 %	0.42 %		
	400 to 800	0.43 %	0.43 %		
	800 to 4000	0.44 %	0.44 %		
	4000 to 8000	0.45 %	0.45 %		
	8000 to 125 000	0.46 %	0.46 %		



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DENSITY				Penton
Liquids -40 °C to 150 °C	0.60 g/ml to 1.65 g/ml	0.012 %	Calibrated to ASTM D1480	
15 °C, 20 °C & 25 °C	0.60 g/ml to 1.65 g/ml	0.027 %	Calibrated to ASTM D4052	
15 °C, 20 °C & 25 °C	0.60 g/ml to 1.65 g/ml	0.027 %	Calibrated to ASTM D4052	
Density in Air at 20 °C of Ethanol Water Mixtures	0.8857 kg/m ³ to 0.9912 kg/m ³	0.01 %	Calibrated to ASTM D1480 (modified) Corresponding to 70% to 5% Ethanol by Volume taken as the % alcohol by volume corresponding to that density in air from the Official Laboratory Alcohol Table (RDC80/264/04), Issued under the authority of the UK HM Customs & Excise.	
FLASH POINT				
Pensky-Martens Closed Cup Flash Point	40 °C to 370 °C	0.50 °C	Flash point standards calibrated to ASTM D93 Procedures A & B	
Cleveland Open Cup Flash Point	79 °C to 400 °C	1.5 °C	Flash point standards calibrated to ASTM D92	
Total Acid Number (TAN)	0.1 to 150 mg KOH/g	1.1%	Calibrated to ASTM D664 in a matrix of Base Oil	
Total Base Number (TBN)	1 to 300 mg KOH/g	1.3%	Calibrated to ASTM D2896 in a matrix of Base Oil	
Sulfur content	<0.1 ug/g m/m to 5.00% m/m	1.0%	Calibration by inhouse method based on ASTM D2622 mass by mass (m/m)	
pH MEASUREMENT				
pH of Buffer Solutions	4 pH to 10 pH units at temperatures of 20 °C and 25 °C.	0.01 pH to 0.02 pH units	Calibration procedure based on ASTM E70	



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HYDROCARBON BLENDING Smoke Point Reference Fuel Blends	2,2,4-Trimethylpentane/Toluene mixtures from 60 % to 100 % v/v 2,2,4-trimethylpentane	0.01% RSD	Equivalent to a smoke point of 14.7 mm to 42.8 mm as per ASTM D1322 and IP 598	
ELECTRICAL CONDUCTIVITY Electrical Conductivity of Aqueous solutions	2 $\mu\text{S/cm}$ to 500,000 $\mu\text{S/cm}$	7.5% to 0.3% relative		
COLOUR CIE tristimulus values	Wavelength 360 nm to 830 nm Y x y	0.2 0.00050 0.00060	Mathematical derivation in accordance with ASTM E308	
ASTM colour	<0.5 to 8	0.10	Mathematical derivation in accordance with ASTM D6045	
Saybolt colour	-16 to +30	1.0		
Gardner colour	1 to 18	0.10	Mathematical derivation in accordance with ASTM D6166	
Platinum-Cobalt colour	0 to 500	1.0	Mathematical derivation based on CIE tristimulus values	
VAPOUR PRESSURE Total vapour pressure	7 kPa to 130 kPa	0.5 kPa	Calibration by inhouse method based on ASTM D5191	
Dry vapour equivalent	7 kPa to 130 kPa	0.5 kPa		

Flexible Scope

The laboratory is accredited to ISO/IEC17025:2017 for calibration activities in accordance with the standards highlighted in the schedule. This may also include new versions of existing accredited standard test methods to be introduced in accordance with documented in-house procedure QA018, providing that:

(1) The method or standard does not introduce new principles of measurement.

(2) The method or standard does not require measurements to be made outside the parametric boundaries defined within the standard specifications already accredited and detailed within this Schedule of Accreditation.

Information about flexible scopes of accreditation is available in UKAS document GEN 4 and EA document EA-2/05.

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