Schedule of Accreditation

issued by

United Kingdom Accreditation Service

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

0247

Accredited to ISO/IEC 17025:2017

Poulten Selfe and Lee Ltd

Issue No: 029 **Issue date:** 01 September 2021

PSL Calibration Laboratory
Russell House
Burnham Business Park
Burnham-on-Crouch
Essex
CM0 8TE

Contact: Mr S J Gosling
Tel: +44 (0)1621 787100
Fax: +44 (0)1621 787175
E-Mail: sales@psl-rheotek.com
Website: www.psl-rheotek.com

Calibration performed at the above address only

Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
TEMPERATURE			
Digital contact thermometers (DCTs)	-40 °C to 0 °C Ice Point (0 °C) 0 °C to 150 °C	0.010 °C 0.010 °C 0.010 °C	Digital contact thermometers (DCTs) for use according to ASTM D445, IP71 part1 and ISO3104 Different immersion characteristics may increase the uncertainty value
VISCOSITY			
Capillary viscometer calibration			
Viscosity constant 'C'	'C' $(mm^2s^{-1})s^{-1}$		
Master viscometers - Ubbelohde	0.001 0.003 0.01 0.03 0.05 0.1 0.3 0.5 1 3 5 15 30 100	0.11 % 0.11 % 0.11 % 0.12 % 0.13 % 0.14 % 0.15 % 0.17 % 0.19 % 0.20 % 0.22 % 0.24 % 0.26 % 0.28 %	Calibrated to ASTM D2162-17

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)		Remarks
VISCOSITY (cont'd)				
Reference viscometers:				
Direct flow - PSL suspended level type	'C' $(mm^2s^{-1})s^{-1}$			
	0.001	0.12 %		Calibrated to ASTM D446-12(2017) and ISO 3105:1994 in direct comparison with master viscometers calibrated to ASTM D2162-17
	0.003	0.12 %		
	0.01	0.13 %		
	0.03	0.15 %		
	0.1	0.17 %		
	0.3	0.19 %		
	1	0.22 %		
	3	0.23 %		
	10	0.27 %		
	30	0.45 %		
	100	0.45 %		
Routine viscometers:				
Ubbelohde				
Suspended Level	'C' $(mm^2s^{-1})s^{-1}$	Direct flow	Reverse flow	
	0.001	0.13 %	0.19 %	Calibrated to ASTM D446-12 (2017) and ISO 3105:1994 in direct comparison with reference viscometers or using viscosity standards calibrated to ASTM D2162-17.
	0.003	0.13 %	0.20 %	
	0.01	0.14 %	0.20 %	
	0.03	0.17 %	0.23 %	
	0.1	0.20 %	0.25 %	
	0.3	0.22 %	0.27 %	
	1	0.24 %	0.31 %	
	3	0.29 %	0.35 %	
	10	0.29 %	0.35 %	
	30	0.46 %	0.50 %	
	100	0.46 %	0.50 %	
Viscosity Reference Standards and Viscosity Measurement	mm^2s^{-1}	Kinematic	Dynamic	
	0.4 to 6	0.30 %	0.30 %	Viscosity reference standards calibrated to ASTM D2162-17. Temperature range 20 °C to 150 °C.
	6 to 19	0.30 %	0.30 %	
	19 to 100	0.30 %	0.30 %	
	100 to 240	0.30 %	0.30 %	
	240 to 465	0.64 %	0.64 %	
	465 to 1130	0.64 %	0.64 %	
	1130 to 1740	0.65 %	0.65 %	
	1740 to 3980	0.67 %	0.67 %	
	3980 to 12500	0.67 %	0.67 %	
	12500 to 34000	0.68 %	0.68 %	
	34000 to 150000	0.80 %	0.80 %	

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty (k = 2)	Remarks
VISCOSITY (cont'd)			
Viscosity Reference Standards and Viscosity Measurement	mm^2s^{-1}	Kinematic	
	0.4 to 6	0.38 %	Viscosity reference standards calibrated to ASTM D2162-17 using reference viscometers. Temperature range -40 °C to 0 °C.
	6 to 19	0.41 %	
	19 to 100	0.55 %	
	100 to 240	0.61 %	
	240 to 465	0.64 %	
	465 to 1130	0.88 %	
	1130 to 1740	0.89 %	
	1740 to 150000	0.91 %	
Viscosity Reference Standards and Viscosity Measurement	mm^2s^{-1}	Kinematic / Dynamic	
	0.4 to 6	0.37 % / 0.37 %	Viscosity reference standards calibrated to ASTM D2162-17 using reference viscometers. Temperature range 20 °C to 150 °C.
	6 to 19	0.38 % / 0.38 %	
	19 to 100	0.40 % / 0.40 %	
	100 to 240	0.42 % / 0.42 %	
	240 to 465	0.71 % / 0.71 %	
	465 to 1130	0.72 % / 0.73 %	
	1130 to 1740	0.73 % / 0.73 %	
	1740 to 3980	0.75 % / 0.76 %	
	3980 to 12500	0.83 % / 0.84 %	
	12500 to 34000	0.84 % / 0.84 %	
	34000 to 150000	0.84 % / 0.84 %	
DENSITY			
Liquids	0.65 g/ml to 0.93 g/ml	0.040 %	Calibrated to IP 189/190-2005 Temperature range 20 °C to 150 °C.

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