## **Schedule of Accreditation**

issued by

**United Kingdom Accreditation Service** 

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



Calibration and Measurement Capability (CMC)

Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( <i>k</i> = 2)	Remarks
OPTICAL DENSITY (ABSORBANCE) Sealed liquid cells containing nicotinic acid solution prepared from AR grade material	Absorbance in the range 0.050 to 1.090, dependent on concentration and wavelength <i>At 213 and 261 nm:</i> Solution concentration 6 mg/l 12 mg/l 18 mg/l 24 mg/l Absorbance in the range 1.5 to 2.5, dependent on concentration and wavelength <i>At 213 and 261 nm:</i> Solution concentration 36 mg/l 48 mg/l 60 mg/l	0.0050 0.0050 0.0050 0.0050 At 213 nm At 261 nm 0.0070 0.0070 0.0070 0.0071 0.0100 0.0101	Comparison against reference standards

	Schedule of Accreditation issued by United Kingdom Accreditation Service 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK Starna Scientific Ltd		
0659	Issue No: 023 Issue date: 14 June 2024		
Accredited to ISO/IEC 17025:2017			
Calibration performed at main address only			
Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( <i>k</i> = 2)	Remarks
Sealed liquid cells containing potassium dichromate solution prepared from NIST SRM 935a	Absorbance in the range 0.096 to 3.552, dependent on concentration and wavelength <i>At 235 nm, 257 nm, 313 nm and 350 nm:</i> Solution concentration 10 mg/l 20 mg/l 40 mg/l 50 mg/l 60 mg/l 100 mg/l 120 mg/l 140 mg/l 120 mg/l 140 mg/l 200 mg/l 220 mg/l 240 mg/l	0.0022 0.0037 0.0045 0.0047 0.0049 0.0058 0.0068 0.0084 0.0091 0.0098 0.011 0.012 0.013 0.013	
OPTICAL DENSITY (ABSORBANCE)			Comparison against reference standards
Sealed liquid cell containing potassium dichromate solution prepared from NIST SRM 935a	Absorbance value in the range 0.948 to 0.960 <i>At 430 nm:</i> Solution concentration 600 mg/l	0.0043	
Sealed liquid cells containing DNACON 260/280®	<i>At 260 nm, 280 nm and 330 nm:</i> Absorbance value in the range 0.0 to 1.0	0.0043	Uncertainty quoted for Absorbance
Sealed liquid cells containing Toluene/Hexane	At peak/trough values in the range 265 nm to 270 nm: Absorbance values in the range 0.1 to 0.5	0.0049	Uncertainty quoted for Absorbance
Sealed liquid cells containing 'Starna Green' solution	Absorbance in the range 0.0 to 3.0, dependent on concentration and wavelength At 258 nm, 415 nm, and 630 nm: Absorbance in the range: 0.0 - 1.2 1.2 - 1.9 1.9 - 2.2 2.2 - 2.7 2.7 - 3.0	0.0065 0.0065 0.0097 0.0097 0.0353	

ſ

	Schedule of Accreditation issued by United Kingdom Accreditation Service 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK Starna Scientific Ltd Issue No: 023 Issue date: 14 June 2024		
UKAS			
CALIBRATION			
Accredited to			
ISO/IEC 17025:2017			
	Calibration performed	at main address only	
Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( <i>k</i> = 2)	Remarks
Sealed liquid cells containing "Deep UV" solution	Absorbance in the range 0.3 to 1.0, dependent on wavelength		
Neutral density glass filters	At 192 nm, 210 nm, and 226 nm: At 440 nm, 465 nm, 546.1 nm, 590 nm and 635 nm: Nominal transmittance, T (Absorbance) 92 % (0.063) 79 % (0.100) 73 % (0.137) 60 % (0.222) 56.5 % (0.148) 50 % (0.301) 40 % (0.398) 30 % (0.523) 25 % (0.602) 20 % (0.699) 10 % (1.000) 6 % (1.222) 3 % (1.523) 1.5 % (1.824) 1.0 % (2.000) 0.3 % (2.523) 0.1 % (3.000)	0.0048 0.0027 0.0025 0.0025 0.0025 0.0025 0.0052 0.0052 0.0059 0.0019 0.0019	Uncertainty quoted for Absorbance
OPTICAL DENSITY (ABSORBANCE) Neutral density glass filter	At 440 nm, 465 nm, 546.1 nm, 590 nm and 635 nm: Nominal transmittance. T		Comparison against reference standards
	0.06 % (3.2) 0.03 % (3.5) 0.0112 % (4.0) Absorbance in the range: 0.0 - 1.2 1.2 - 1.9 1.9 - 2.2 2.2 - 2.7 > 2.7	0.019 0.019 0.019 0.0052 0.0059 0.011 0.019	Uncertainty quoted for Absorbance

Ι

UKAS CALIBRATION 0659 Accredited to ISO/IEC 17025:2017	Schedule of Accreditation issued by United Kingdom Accreditation Service 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK Starna Scientific Ltd Issue No: 023 Issue date: 14 June 2024		
	Calibration performed	at main address only	
Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty $(k = 2)$	Remarks
Neutral density glass filters Neutral density Metal-on-Quartz filters	At 1100 nm, 1700 nm, 2210 nm, 2500 nm and 2850 nm: Nominal transmittance, T (Absorbance) 61% to 19 % (0.215 to 0.721) 5.7 % (1.244) 2.9 % (1.538) 1.5 % (1.824) 250 to 3200 nm Nominal transmittance, T (Absorbance) 90 % (0.03) 60 % (0.22) 50 % (0.30) 30 % (0.523) 20 % (0.70) 10 % (1.000) 3.0 % (1.523) 1.0 % (2.000)	0.0035 0.0046 0.0072 0.011 0.0020 0.0025 0.0025 0.0040 0.0043 0.0043 0.0045 0.0058 0.0059	Uncertainty quoted for Absorbance Uncertainty quoted for Absorbance
WAVELENGTH Sealed liquid cells containing "Rare Earth" (RE) solution. Multiple peak wavelengths reported.	200 nm to 300 nm	0.18 nm	Comparison against reference standards
Sealed liquid cells containing Rare Earth solution. Multiple peak wavelengths reported.	240 nm to 870 nm	0.11 nm	

0.11 nm

Sealed liquid cells containing Mixed Rare Earth solution. Multiple peak wavelengths reported

240 nm to 870 nm



	Schedule of Accreditation issued by United Kingdom Accreditation Service 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK		
UKAS CALIBRATION 0659 Accredited to ISO/IEC 17025:2017	Starna Scientific Ltd Issue No: 023 Issue date: 14 June 2024		
	Calibration performed	at main address only	
Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( <i>k</i> = 2)	Remarks
RELATIVE FLUORESCENCE INTENSITY			
Concentration series of sealed liquid cells containing Quinine Sulfate solution prepared from NIST SRM 936a	Relative fluorescence intensity in the range 0.25 RFU to 1.00 RFU, dependent on concentration and integrated emission range.		Comparison against reference standards
	Integrated emission range of 375 nm to 675 nm. Solution nominal relative emission intensity:		
	0.25 RFU 0.50 RFU 0.75 RFU 1.00 RFU	1.4% 1.0% 0.9% 0.8%	
Concentration series of Solid state Starna Flourescent Orange® in 96-well plate format.	Relative fluorescence intensity in the range 0.05 RFU to 2.00 RFU with integrated emission range 520 nm to 600 nm.		Comparison against reference standards
	Material nominal relative emission intensity: 0.05 RFU 0.10 RFU 0.50 RFU 1.00 RFU 2.00 RFU	≤ 36.3% ≤ 17.9% ≤ 5.0% ≤ 3.2% ≤ 3.3%	
Concentration series of solid state or sealed liquid cell fluorescent Reference Materials in cuvette, 96-well plate or other suitable physical formate	Relative fluorescence intensity in the range 0.05 RFU to 2.00 RFU dependant on specified integrated emission range.		Comparison against reference standards
	Suitable integration range. Material nominal relative emission intensity: 0.05 RFU 0.10 RFU 0.50 RFU 1.00 RFU 2.00 RFU	≤ 40% * ≤ 20% * ≤ 10% * ≤ 5% * ≤ 5% *	* approximate maximum values for full intensity range. Values will vary with material type and emission wavelength/intensity range.

	Schedule of Accreditation issued by United Kingdom Accreditation Service 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK		
O659 Accredited to ISO/IEC 17025:2017	Starna Scientific Ltd Issue No: 023 Issue date: 14 June 2024		
	Calibration performed	at main address only	
Measured Quantity Instrument or Gauge	Range	Expanded Measurement Uncertainty ( <i>k</i> = 2)	Remarks
CORRECTED EMISSION SPECTRUM Solid state ceramic doped with Fluorescent Reference material	Relative fluorescence intensity in the range 0.10 RFU to 1.00 RFU		Comparison against reference standards.
in 96-well plate format. Suitable solid state or sealed solution cell fluorescent Reference Materials in cuvette, 96-well plate or other suitable physical formats	dependant on wavelength. Wavelength range: 650 - 749 nm Relative fluorescence intensity in the range 0.10 RFU to 1.00 RFU dependant on wavelength. Wavelength range: 320 - 830 nm	9% - 14%	Comparison against reference standards
	320 - 630 mm	<u> </u>	Values will vary with material type and certified emission range.
CIRCULAR DICHROISM Sealed cells containing Starna Reference Materials for Circular Dichroism Type A (either one of two enantiometers in aqueous solution)	Circular dichroism in the range -200 ≤ Δε ≤ 200 mdeg, dependent on concentration and wavelength: Solution 'UV-RR' or 'UV-SS' Individual maxima & minima (±1 nm)		Comparison against reference standards
	210 nm 237 nm 274 nm 545 nm	3.4 mdeg 0.7 mdeg 0.5 mdeg 0.3 mdeg	
	Continuous model $190 \le \lambda \le 700 \text{ nm}$ Solution 'Vis-RR' or 'Vis-SS'	0.3 – 4.0 mdeg	
	Individual maxima & minima (±1 nm)	1.0 mdea	
	479 nm 545 nm 605 nm	1.3 mdeg 3.5 mdeg 1.0 mdeg	
	Continuous model 400 ≤ λ ≤ 700 nm	0.3 – 6.0 mdeg	
END			



# Schedule of Accreditation issued by

United Kingdom Accreditation Service 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

### Starna Scientific Ltd

Issue No: 023 Issue date: 14 June 2024

Accredited to ISO/IEC 17025:2017

#### Calibration performed at main address only

#### Flexible scope

The laboratory is accredited to ISO/IEC17025:2017 for calibration activities in accordance with the details listed in this schedule. This may also include calibrations on the same or similar products against standards, laboratory developed procedures or customer-specified methods, that are not specifically listed in this Schedule, providing that:

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

(2) The method, procedure or standard does not require measurements to be made outside the parametric boundaries defined in this Schedule.

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

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