Certified Reference Materials for UV, Visible, NIR and IR Molecular Spectroscopy

RM-020406

Set Serial No:

Customer Details:

The customer information stated on this page, number 1 of 3 applies to all certificates.

UKAS accreditation applies to all Wavelength, Transmission/Absorbance, Stray Light references, and those used for Resolution measurements.

BSI REGISTERED NATIONAL ACCREDITATION OF CERTIFICATION BODIES Registered No. FM 30093

UKAS CALIBRATION 0659

UKAS REFERENCE MATERIALS 4001

Certificate of Calibration and Traceability

Calibration Lab.
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Potassium Dichromate in Perchloric acid sealed in Far UV quartz cells for use as a linearity and photometric accuracy reference in the UV.

Certificate Number:	**58572**
Certificate Date:	**1 August 2016**
Expiration Date:	**1 August 2018**
Analysis Number:	**20534**
Set Serial Number:	**23152**
Blank Serial Number:	**59379**

UKAS CALIBRATION
0659

Description of Reference Material:

NIST SRM 935a Potassium Dichromate is used to prepare the reference solutions.These are sealed by heat fusion in high quality Far UV quartz cells. Certification is performed in accordance with the instructions that are issued with NIST SRM 935a.All procedures are implemented in accordance with ISO/IEC 17025 and ISO Guide 34. Additional information can be found on the Starna web site at www.starna.com

Certified Values of Reference Material:

The Potassium Dichromate filled cells are measured against a Perchloric acid blank. The net absorbance values are listed in the table below. Under the analytical procedures used, as outlined by NIST in the Appendix NIST Special Publication 260-54.

The combined analytical and instrument uncertainties at a coverage probability of 95 % is 0.0037 A at 20 mg/l, 0.0045 A at 40 mg/l, 0.0049 A at 60 mg/l, 0.0058 A at 80 mg/l, 0.0068 A at 100 mg/l, 0.0084 A at 120 mg/l, 0.0091 A at 140 mg/l, 0.0098 A at 160 mg/l, 0.011 A at 180 mg/l, 0.012 A at 200 mg/l, 0.013 A at 220 mg/l, 0.013 A at 240 mg/l and 0.0043 at 600 mg/l.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2. providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

The weight shown below is the mean calculated weight of potassium dichromate in this solution using the specific absorbance values quoted on the NIST SRM 935a certificate, together with the certified absorbance values.

Nominal Concentration:	Wavelength:	Absorbance:	Calculated Weight:
Potassium Dichromate 20 mg/l	350 nm	0.2077	
	313 nm	0.0944	mg/l ± 0.5 mg/l (k=2)
Cell Serial No: 54792	257 nm	0.2798	
	235 nm	0.2457	19.74
Potassium Dichromate 40 mg/l	350 nm	0.4241	
	313 nm	0.1924	mg/l ± 0.5 mg/l (k=2)
Cell Serial No: 52474	257 nm	0.5719	
	235 nm	0.4951	40.07
Potassium Dichromate 60 mg/l	350 nm	0.6385	
	313 nm	0.2908	mg/l ± 0.5 mg/l (k=2)
Cell Serial No: 59054	257 nm	0.8612	
	235 nm	0.7435	60.21

Set Serial Number: **23152**
Starna Certificate No: **58572**
Certificate Date: **1 August 2016**
Analysis Date: **1 August 2016**

UKAS Accredited Calibration Laboratory No. 0659

Certifying Instrument Qualification:

All calibration is performed on one of a series of high performance reference spectrophotometers. The instruments are tested and qualified to the manufacturer's published specification over the analytical range used for the reference material certification.
The following primary references and fundamental procedures are used in the qualification of the reference spectrophotometers:

Absorbance:	NIST SRM 2031, 1930 & 930e, Double aperture method
Wavelength:	NIST SRM 2034, Emission lines of Hg & deuterium
Stray Light:	NIST SRM 2032, KCl, KI & lithium carbonate
Resolution:	Benzene vapor, half width of D2 656.1 nm line

Calibration Method:

The conditions of analysis used to generate the certified values on this certificate are as listed in the chart below:

Cell Pathlength:	10 mm	+/- 0.01mm
Cell Material:	Spectrosil Quartz	
Blank Solution:	0.001M Perchloric acid	
Scale:	Absorbance	
Range:	350 to 235 nm	
Band width:	1.0 nm +/- 0.2nm	
Temperature:	23.5 +/- 1.0 °C	

Instructions for Use:

Determine the absorbance of each cell against the supplied blank at each of the four listed wavelengths. Repeat several times.To test instrument linearity, plot the results on a graph of absorbance vs concentration. The graph should produce straight lines if your instrument is linear in the region. To assess photometric accuracy, compare the net absorbance reading at each concentration and wavelength to the published values on this certificate.
The absolute difference between the mean measured value and the certified value will not exceed the sum of the certified uncertainty and the specified accuracy of the instrument, if the instrument is performing correctly

Instrument Dependencies:

The instrument must be designed to be used in the ultraviolet region down to 230nm and have a spectral bandpass of 1.6nm or less. Consult your instrument owners manual for this information.

Duration of Certificate:

This certificate is valid for a maximum period of two years from the date of issue or sooner if specified by the user's own protocols. Although the references are covered by a lifetime guarantee this is subject to certain conditions, see guidance notes.

Re-certification Procedure:

All reference materials are certified and supplied in a useable condition. There is no warranty for fitness beyond receipt by the customer. When references need to be re-certified or inspected for any reason, customers should return them to the Starna ISO/IEC 17025 & ISO Guide 34 accredited calibration laboratory, where all original data is collated.

On receipt by Starna Scientific the references are measured “As received”, before cleaning under the re-certification procedure. “As received” data is available on request.

Storage and Care:

References should always be stored in the box provided and handled with extreme care. Quartz cells are fragile and should be inserted and removed from the instrument by holding the cell cap, taking care not to twist or apply leverage against the cell holder, as this may crack the cells. Damage in the form of scratches may alter the certified values significantly such that they need re-certifying and may, as with cracks, require complete replacement. For cleaning see guidance notes.

Calibration performed by:

A. Wakelin CSci CChem MRSC

Approved Signatory:

J. P. Hammond CSci CChem FRSC