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

RM-DG/CW

Set Serial No: 32314

APROVADO
Responsável: RENATO
Padrão: I001A03FD
Data: 09/07/2020
Validade: 11/06/2022

Customer Details:

ER Analytic Ltda
Rua Itaici, 130
Sao Paulo
Brazil
CNPJ: 17,358,703 / 0001-99

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

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

UKAS CALIBRATION 0059
UKAS REFERENCE MATERIALS 4001

Reference Material
Certificate of Calibration and Traceability

Calibration Lab.
Starna Scientific Ltd
52/54 Fowler Rd
HAINAULT
Essex IG6 3UT
England
Tel. +44 (0) 20 8501 5550

Email: sales@starna.com

Didymium glass filter for use as a wavelength accuracy reference in the UV and visible spectrum

Certificate Number:	**84767**
Certificate Date:	**11 June 2020**
Expiration Date:	**11 June 2022**
Analysis Number:	**DG03060801**
Set Serial Number:	**32314**
Cell Serial Number:	**86280**

UKAS CALIBRATION
0659

Description of Reference Material:

This reference material consists of an optical glass filter containing didymium (a mixture of neodymium and praesodymium) which has distinct absorption bands. The reference material is designed for the verification and calibration of the wavelength scales of visible and ultraviolet spectrophotometers having nominal spectral bandwidths of 5 nm or less. All procedures are implemented in accordance with ISO/IEC 17025 and ISO 17034. Additional information can be found on the Starna web site at www.starna.com

Certified Values of Reference Material:

The didymium glass filter is measured in the absorbance mode against an air blank, over the wavelength range of 890 to 430 nm. For each spectral bandwidth, a baseline correction is performed with an empty cell holder.
The 11 peak maxima are identified and certified to be within the expected wavelength range tolerance for each spectral bandwidth (SBW).

The combined analytical and instrument uncertainties at a coverage probability of 95 % is 0.11 nm.

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

SBW	Wavelengths in nanometers of peak maxima as referenced to air, +/- 0.11 nm										
0.10	879.22	806.96	748.56	741.21	684.52	585.25	572.89	528.89	513.44	472.75	431.04
0.25	879.44	807.07	748.49	741.22	684.51	585.15	573.01	528.89	513.42	472.71	431.07
0.50	879.45	807.10	748.58	741.04	684.48	585.27	572.97	528.89	513.41	472.61	431.12
1.00	879.41	807.02	748.56	741.02	684.50	585.19	572.99	528.90	513.39	472.66	431.22
1.50	879.28	807.03	748.55	740.72	684.40	585.35	573.17	528.88	513.47	472.50	431.38
2.00	879.27	807.03	748.48	740.18	684.49	585.29	573.33	528.83	513.41	472.47	431.57
3.00	879.40	807.02	748.37	740.15	684.31	585.43	573.93	528.69	513.23	472.16	431.90
4.00	879.70	807.16	748.28	740.27	684.63	585.48	574.60	528.72	513.70	472.22	440.74
5.00	879.68	807.04	747.61	740.51	684.70	585.56	575.10	528.59	513.75	479.88	441.29

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This certification is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised standards laboratories.

Starna Cell Serial Number: **86280**
Certificate Number: **84767**
Certificate Date: **11 June 2020**
Verification Date: **11 June 2020**

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:

Filter Material	Didymium oxide glass
Reference:	Air
Scale:	Absorbance
Range:	890 to 430 nm
Band width:	Multiple
Temperature:	23.5° C +/- 1.0 °C

Instructions for Use:

Remove the sliding window covers from both sides of each filter to be used. Place the filter in the sample compartment as you would for any sample. Leave the reference cell holder empty as all measurements are to be made against air. Measurements should be made within the temperature range of 20° to 30° C. In the absorbance mode scan the filter over the required range. Find the peak maxima and compare them to the certified wavelengths on this certificate as indicated for the spectral bandwidth (SBW) used by your instrument. If you find any significant differences, it is recommended that a service technician inspect your instrument to determine the source of the difference.

Instrument Dependencies:

The instrument to be tested should have a SBW not exceeding 5 nm. Consult the instrument owners handbook 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 17034 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. Filters are fragile and should be inserted and removed from the instrument taking care not to twist or apply leverage against the cell holder, as this may crack the filter. Damage in the form of scratches or contamination may alter the certified values significantly such that they need re-certifying or even complete replacement. For cleaning see guidance notes.

Calibration performed by:

Calibration Manager - A. Wakelin CSci CChem MRSC

Approved Signatory:

Technical Manager - J. P. Hammond CSci CChem FRSC

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Reference Material
Certificate of Calibration and Traceability
Addendum for Large Spectral Bandwidths (SBW)

0659

Calibration Lab
Starna Scientific Ltd
52/54 Fowler Rd
HAINAULT
Essex IG6 3UT
England
Tel. +44 (0)20 8501 5550

Email: starna@starna.com

Didymium Glass filters for use as a wavelength accuracy reference in the UV and visible spectrum.

Certificate Number: **84767** **Pt 2.**
Certificate Date: **11 June 2020**

Set Serial Number: **32314**
Cell Serial Number: **86280**

SBW 10 nm

Description of Reference Material:

This reference material consists of an optical glass filter containing didymium (a mixture of neodymium and praseodymium) oxide which has distinct absorption bands.
The reference material is designed for the verification and calibration of the wavelength scales of visible and ultraviolet spectrophotometers having nominal spectral bandwidths of 10 nm or less.

Information Values of Reference Material:

The Didymium Glass filter is measured in the transmission mode against an air blank, over the wavelength range of 890 to 430 nm. For the 10 nm spectral bandwidth, a baseline correction is performed with an empty cell holder.
The 11 minimum transmissions are identified and then compared with the equivalent spectral features measured at a five nm spectral bandwidth (SBW).

Where at the 10 nm SBW, comparison with the 5 nm SBW spectrum shows a significant peak shift or lack of resolution caused by the increased bandwidth, the peaks are identified as 'X.X' and therefore no values are shown.

The combined analytical and instrument uncertainties at the 95% confidence level is 1 nm.

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

SBW Wavelengths in nanometres of peak maxima as referenced to air +/- 1 nm.

10	881.5	806.5	X.X	744.5	685.0	585.0	X.X	529.0	X.X	477.0	442.5

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