



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

RM-60/MT

Set Serial No: 41721

Customer Details:

Mettler Toledo Logistik GmbH
Finance Shared Service Center
1m Longacher 44
CH-8606 Greifensee
Switzerland

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

Original Starna references are manufactured under ISO 17034:2016 accreditation

All calibration measurements are performed under ISO/IEC 17025:2017 accreditation.





PACKING LIST (RE)CALIBRATION

Starna scientific

Certified Reference Materials for UV and Visible Spectrophotometry

Dear Customer

Please Find Enclosed

1. (Re)certified Filter(s) or Sealed Cell(s) Reference Sets
2. All appropriate certificates (USB Pen Drive)

AS THE CONTENTS MAY HAVE MOVED IN SHIPPING, PLEASE CHECK THE BOX THOROUGHLY FOR THE ABOVE ITEMS. MAY WE SUGGEST YOU RETAIN THIS 'PURPOSE MADE' PACKING FOR FUTURE USE WHEN THE SETS ARE RETURNED FOR RECERTIFICATION

Packed by

Michelle

Date:

23/8/23

Please report any discrepancies to:

Starna Scientific
52/54 Fowler Road
Hainault
Essex IG6 3UT
Tel. +44 (0)20 8500 1264
Email sales@starna.com

Fax. +44 (0)20 8500 1955



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Registration is essential for the LIFETIME GUARANTEE*

Please use the on line registration system, a link to which can be found on your USB drive. Simply open the index page in your browser and follow the links provided.

Starna scientific

Set No: _____ Set Type: _____

Company: _____ Name: _____

Address: _____ Position: _____

_____ E-mail: _____

Should for any reason difficulties be encountered, with the online registration system. Please complete and return this registration document, (using the pre-paid envelope) combined with the customer feedback questionnaire below, which offers you the opportunity to comment on our service.

Registration is essential for the LIFETIME GUARANTEE*, it will also allow the Company to provide you with important information, such as changes in legislation or certification.

We would like to thank you in advance for your co-operation, and look forward to receiving the completed registration form.

* When returned for re-certification, if the measured assigned value falls outside the uncertainty budget (k=3), a registered customer will be given the option of replacement at our expense, providing that the set has not been physically, thermally or optically abused. Original STARNA branded cells and reference sets only.

The Starna Scientific laboratory provides calibration services to customers on a worldwide basis. Customers include the pharmaceutical industry, instrument manufacturers, universities and analytical laboratories of all types. In accordance with accreditation to ISO 17025:2017 and ISO 17034:2016, our calibration laboratory seeks to maintain the highest standard of customer care, professionalism, efficiency and reliability. To maintain continuous improvement in the quality of services provided it is necessary to establish customer contact information and feedback.

Quality assurance feedback survey:

Overall, what was the quality of the services we provided?

Very Good Good Average Poor Very Poor

Would you recommend our laboratory to others?

Yes No

How quick was our response to your request?

Very quick Quick Acceptable Slow Very Slow

Was your request dealt with in a courteous manner?

Yes No

Was your complaint resolved to your complete satisfaction?

Not Applicable Yes No

Additional Comments and/or Suggestions:



**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

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



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Certificate Number: 114060
Certificate Date: 22 August 2023
Expiration Date: 22 August 2025
Analysis Number: 39207
Set Serial Number: 41721
Blank Serial Number: 126063

Email: sales@starna.com

Description of Reference Material:

NIST Potassium Dichromate SRM 935a, is used to prepare the reference solutions. The solutions are sealed by heat fusion in high quality Far UV quartz cells. The sealed solutions are then analyzed and certified for use in assessing the performance of spectrophotometers in the Ultraviolet region in accordance with the instructions that are issued with NIST SRM 935a. All procedures are implemented in accordance with ISO/IEC 17025 and ISO 17034. Additional information and MSDS sheets 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

Nominal Concentration:	Wavelength:	Absorbance:	Calculated Weight:
Potassium Dichromate 600 mg/l			
Cell Serial No: 124946	430 nm	0.9496	597.25 mg/l \pm 2.7 mg/l ($k=2$)

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at NIST, NPL or other recognised National Metrology Laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Starna Certificate Number: 114060
Certificate Date: 22 August 2023
Analysis Date: 22 August 2023
Set Serial Number: 41721

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 \pm 0.01mm
Cell Material: Spectrosil Quartz
Blank Solution: 0.001M Perchloric acid
Scale: Absorbance
Range: 430 nm
Band width: 0.5 to 1.6 nm \pm 0.2nm
Temperature: 23.5 \pm 1.0 °C

Instructions for Use:

Determine the absorbance of the reference against the supplied blank at the listed wavelength. Repeat several times. 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.

All rights reserved. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. This certification must not be used by a third party to claim product endorsement by the accreditation body or any agency of the U.S. or U.K. governments.

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. 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

Calibration Technician - K. Szymanski MRSC

Approved Signatory:

Calibration Manager - A. Wakelin CSci CChem MRSC

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at NIST, NPL or other recognised National Metrology Laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



Reference Material Certificate of Calibration and Traceability



0659

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

Email: sales@starna.com

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Liquid reference for use in the UV and Visible regions of
the spectrum to verify the wavelength and absorbance scales

Vial Batch Number: SG13102103
Certificate Number: 110751
Calibration Date: 06 July 2023
Analysis Number: 155233SG2
Expiry Date: 06 July 2024
Traceable to: See Below NIST SRM 2034.930e
Series No: 97.2272

Description of Reference Material:

This reference material consists of a green dye solution which has distinct absorption/transmission and peak characteristics, supplied together with a solvent blank.

Each liquid is supplied in a 1.5 ml screw cap vial.

This certificate is valid until the date shown above or until the vial is opened, whichever is sooner.

Certified Values of Reference Material:

The liquid reference is measured in the Absorbance mode against a solvent blank, in a 1.000 mm path length cell. At 4.0 & 5.0 nm spectral bandwidth a baseline correction is performed against a solvent blank.

The 3 major absorption peaks are identified and certified to be within the expected wavelength range tolerance.

The combined analytical and instrument uncertainties at the 95% confidence level ($k=2$) is 0.5 nm.

Reference Serial

Number:	Reading Scale:	(1)	(2)	(3)	(4)
SG13102103					
4nm SBW	Wavelength(s):	257.2	415.9	629.6	405.0
5nm SBW	Wavelength(s):	257.3	415.6	629.5	405.0

Each individual reference is measured in the absorption mode against a solvent blank, at the above wavelengths. Replicate absorbance measurements for each reference are measured, and the mean results listed in the table below.

Under the analytical procedures used the combined analytical and instrument uncertainties at the 95% confidence level ($k=2$) is 0.009 A.

Reference Serial

Number:	Reading Scale:	(1)	(2)	(3)	(4)
SG13102103					
4nm SBW	Absorbance (A):	0.981	0.992	1.004	0.940
5nm SBW	Absorbance (A):	0.974	0.989	0.999	0.937

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



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Liquid reference for use in the UV and Visible region of the spectrum
to verify the wavelength and absorbance scales

Filter Serial Number: SG13102103
Certificate Number: 110751
Calibration Date: 06 July 2023
Analysis File number: 155233SG2

UKAS Accredited Calibration Laboratory No.
0659

Certifying Instrument Qualification:

All calibration measurements are performed on reference spectrophotometers. The instruments performance is validated to the manufacturers written specification over the analytical range used for the reference material certification. The following references and procedures are used in the quality performance procedures relating to the qualification of the spectrophotometer performance:

Absorbance: NIST SRM 930e & 1930, Double Aperture method.
Wavelength: NIST SRM 2034, Emission lines of mercury & deuterium.
Stray Light: NIST SRM 2032, KCl, KI & lithium carbonate.
Resolution: Benzene vapour, half width of deuterium 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:

Reference Material: Liquid green dye solution

Reference: Liquid blank
Scale: Absorbance
Range: 250 to 640 nm
Slit width: 4 & 5 nm +/- 0.2 nm
Temperature: 23.5 +/- 0.5 °C

Instructions for Use:

Place the blank in the sample compartment as you would for any sample. Baseline the system, replace the blank with the reference.

Wavelength measurement:

Use appropriate instrument function to establish the maximum peak absorbance values at the wavelengths listed. Compare these values to the certified values.

Absorbance measurement:

In the Absorbance mode set the instrument to the certified wavelength. Zero the instrument using the Blank. Measure the Absorbance values and compare them to the certified values.

With both procedures, if you find any significant differences, it is recommended that an approved manufacturer's representative inspects the instrument to determine the source of the difference.

Instrument Dependencies:

The instrument to be tested should have a SBW not exceeding 5.0 nanometers. Consult the instrument owners handbook for this information.

Duration of Certificate:

This certification is valid for a period of one year from date of issue dependent on the reference remaining in useable condition. If the reference is contaminated, this certificate becomes null and void.

Storage and Care:

Always store the reference(s) in the box when not in use.

Calibration performed by:

P. Wakelin RSci MIScT AMRSC
Calibration Technician

Approved Signatory:

A. Wakelin CSci CChem MRSC
Calibration Manager