

REPORTE MANTENIMIENTO PREVENTIVO Y VERIFICACION OPERACIONAL

Martes 02 de marzo de 2021

ST2021-063

Señores
SGS DEL PERU SAC

Presente.-

Atte: Sr. Juan Carlos Lopez.

Equipamiento Instalado:

	Modelo	Número de Serie
Espectrofotómetro UV-VIS	Evolution 201	5A4S107004

I.- Acciones Generales:

OK

1.- Verificación del voltaje de entrada al equipo:

Línea - neutro	(220V +/- 10%)	220 V	☒
Línea - tierra	(220V +/- 10%)	219.5 V	☒
Neutro - tierra	(entre 0 a 1V)	0.7 V	☒

2.- Verificación de las condiciones Ambientales en el área de trabajo:

Temperatura	(entre 5 a 40 °C)	24°C	☒
Humedad	(entre 20 a 80%)	64%	☒

Observaciones:

II.- Acciones del Mantenimiento Preventivo:

OK

- | | |
|---|-------------------------------------|
| 1.- Encendido del equipo y diagnostico general del sistema.
(Self Test de inicializacion). | ☒ |
| 2.- Procedimiento de acciones de mantenimiento. | ☒ |
| 3.- Desensamble y limpie internamente el equipo, incluyendo el
compartimiento de muestras. | ☒ |
| 4.- Verificacion de la optica del equipo. | ☒ |
| 5.- Ensamble el equipo. | ☒ |
| 6.- Verificacion del flujo de aire alrededor del instrumento (limpio). | ☒ |
| 7.- Limpieza externa del equipo. | ☒ |
| 8.- Verificacion de la energia de las lamparas de tungsteno. | ☒ |

Lamp. Xenon 94,03%

II.- Pruebas de Verificación Operacional:

1.- Prueba de Precisión de Longitud de Onda Interna:

Se realizan tres lecturas y se evalúa la precisión de longitud de onda del equipo utilizando la prueba interna del equipo.

La especificación a usar será la tolerancia de la lámpara de xenón más la tolerancia del instrumento.

Resultado **Paso**
☒

2.- Prueba de Precisión y Exactitud de Longitud de Onda:

Se evalúa la precisión y exactitud de longitud de onda del equipo utilizando un filtro certificado de Holmium y Didymium.

La especificación a usar será el error en exactitud de longitud de onda del equipo más el error de los filtros certificados

Ver Hoja del Sistema de Validación y certificados.

Resultado **Paso**
☒

3.- Prueba de Precisión y Exactitud Fotométrica:

Se realizan quince lecturas y se evalúa la exactitud fotométrica del equipo utilizando tres filtros certificados a 440 nm., 465 nm., 546.1 nm., 590 nm. y 635 nm.

La especificación a usar será el error en exactitud fotométrica del equipo más el error del filtro certificado.

Ver Hoja del Sistema de Validación y Certificados.

Resultado **Paso**
☒

III.- Prueba Final:

Se realiza un análisis de rutina de comprobación y evaluación de resultados.

IV.- Conclusión:

El espectrofotómetro UV-Vis Evolution 201 pasó satisfactoriamente las pruebas de precisión de longitud de onda, precisión y exactitud fotométrica y pruebas de ruido.

El espectrofotómetro UV-Vis Evolution 201 cumple las especificaciones técnicas según fábrica.

Reactivos Para Análisis SAC

Alexandro Villarreal L.
Soporte
Técnico

Cliente _____

CERTIFICADO DE VERIFICACIÓN OPERACIONAL

Declaración obtenida del resultado de la verificación operacional del espectrofotómetro UV-VIS Evolution 201 de Thermo Fisher Scientific.

Cliente: **SGS del Perú S.A.C.**

Dirección: **Av. Elmer Faucett 3348, Callao 1 - Peru**

Dirigido a: **Sr. Juan Carlos Lopez.**

Equipamiento Instalado:

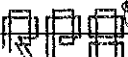
Espectrofotómetro UV-VIS	Modelo Evolution 201	Número de serie 5A4S107004
Código Interno:	MA-238-T	

*La Verificación Operacional del espectrofotómetro UV-VIS Evolution 201 de Thermo Fisher Scientific **fue superada satisfactoriamente.***

Se concluye entonces que el Espectrofotómetro UV-VIS Evolution 201 de Thermo Fisher Scientific cumple con las especificaciones técnicas de fabricante.

Fecha de la Verificación Operacional: 02 de marzo de 2021

Próxima Validación (o después de una reparación mayor): marzo de 2022

REACTIVOS PARA ANALISIS SAC  
Alexandro Villarroel L. Soporte Técnico CLIENTE _____

SISTEMA DE VALIDACION

Cliente : **SGS DEL PERU SAC**

Sistema : **Espectrofotómetro UV-VIS Evolution 201**

Nro de Serie: **5A4S107004**

Cod: **MA-238-T**

Set de Estándares de Longitud de Onda : **RM-HG**

Número de Serie: **30893**

Fecha de Calibración: **02 de enero de 2020**

Set de Estándares de Absorbancia : **RM-1N2N3N**

Número de Serie: **30892**

Fecha de Calibración: **02 de enero de 2020**

SISTEMA DE VALIDACION

EXACTITUD Y PRECISION DE LONGITUD DE ONDA

Tipo de Filtro	Posicion nominal del Pico	Rango	Tolerancia del Filtro	Tolerancia del Equipo	Rango Permitido (nm)	Valor Medido	Pasa/Falla
Holmium	279.44 nm	275 a 285	0.11	0.8	278.5 - 280.3	279.76	Pasa
Holmium	287.71 nm	280 a 290	0.11	0.8	286.8 - 288.6	287.93	Pasa
Holmium	334.02 nm	330 a 340	0.11	0.8	333.1 - 334.9	333.75	Pasa
Holmium	360.89 nm	355 a 365	0.11	0.8	360.0 - 361.8	360.63	Pasa
Holmium	418.53 nm	415 a 425	0.11	0.8	417.6 - 419.4	418.52	Pasa
Holmium	459.99 nm	450 a 460	0.11	0.8	459.1 - 460.9	459.42	Pasa
Holmium	536.52 nm	530 a 540	0.11	0.8	535.6 - 537.4	536.33	Pasa
Holmium	638.00 nm	634 a 644	0.11	0.8	637.1 - 638.9	637.78	Pasa
Didymium	748.20 nm	735 a 755	0.11	0.8	747.3 - 749.1	747.57	Pasa
Didymium	807.70 nm	795 a 815	0.11	0.8	806.8 - 808.6	807.74	Pasa
Didymium	879.60 nm	865 a 885	0.11	0.8	878.7 - 880.5	879.64	Pasa

EXACTITUD Y PRECISION FOTOMETRICA

Filtro	Longitud de Onda	Valor Nominal	Tolerancia del Filtro	Tolerancia del Equipo	Rango Permitido (Abs)	Valor Medido	Pasa/Falla
86704	440.0 nm	1.0081	0.0027	0.006	0.9994 - 1.0168	1.0121	Pasa
	465.0 nm	0.9513	0.0027	0.006	0.9426 - 0.9600	0.9555	Pasa
	546.1 nm	1.0045	0.0027	0.006	0.9958 - 1.0132	1.0062	Pasa
	590.0 nm	1.1145	0.0027	0.006	1.1058 - 1.1232	1.1129	Pasa
	635.0 nm	1.0992	0.0027	0.006	1.0905 - 1.1079	1.1003	Pasa
85439	440.0 nm	0.7032	0.0027	0.004	0.6965 - 0.7099	0.7031	Pasa
	465.0 nm	0.6641	0.0027	0.004	0.6574 - 0.6708	0.6643	Pasa
	546.1 nm	0.7002	0.0027	0.004	0.6935 - 0.7069	0.6990	Pasa
	590.0 nm	0.7754	0.0027	0.004	0.7687 - 0.7821	0.7735	Pasa
	635.0 nm	0.7649	0.0027	0.004	0.7582 - 0.7716	0.7622	Pasa
87013	440.0 nm	0.5657	0.0027	0.004	0.5590 - 0.5724	0.5648	Pasa
	465.0 nm	0.5278	0.0027	0.004	0.5211 - 0.5345	0.5272	Pasa
	546.1 nm	0.5290	0.0027	0.004	0.5223 - 0.5357	0.5276	Pasa
	590.0 nm	0.5632	0.0027	0.004	0.5565 - 0.5699	0.5620	Pasa
	635.0 nm	0.5708	0.0027	0.004	0.5641 - 0.5775	0.5701	Pasa

Ing. de Servicio : **Alexandro Villarroel L**

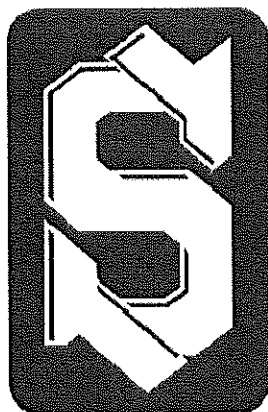
Firma **Alexandro Villarroel L.**

Responsable : _____

Firma **Soporte Técnico**

Reporte de Servicio : **ST2021-063**

Fecha : **02 de marzo de 2021**



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

RM-HG

Set Serial No: 30893

Customer Details:

Reactivos para Analisis S.A.C.
Av. Elmer Faucett No. 1837
Callao 2
Peru

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.





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

Email: sales@starna.com

Reference Material Certificate of Calibration and Traceability

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

Certificate Number: **81061**
Certificate Date: **2 January 2020**
Expiration Date: **2 January 2022**
Analysis Number: **HG03120801**
Set Serial Number: **30893**
Cell Serial Number: **86999**



0659

Page Number 2 of 3

Description of Reference Material:

This reference material consists of an optical glass filter containing holmium 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 5 nm or less.

At higher spectral bandwidths (> 4.0 nm) peaks identified with '00' will not be listed, as they cannot be resolved by the instrument.

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 holmium glass filter is measured in the absorbance mode against an air blank, over the wavelength range of 640 to 240 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 the 95% confidence level 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	637.98	536.42	460.01	453.70	445.78	418.49	360.90	333.95	287.60	279.43	241.65
0.25	638.00	536.45	460.02	453.68	445.78	418.51	360.91	333.96	287.61	279.43	241.66
0.50	638.05	536.44	460.02	453.70	445.78	418.51	360.89	333.98	287.64	279.44	241.67
1.00	638.00	536.52	459.99	453.67	445.82	418.53	360.89	334.02	287.71	279.44	241.70
1.50	637.98	536.59	460.02	453.66	445.94	418.59	360.93	334.06	287.81	279.45	241.72
2.00	637.98	536.66	460.05	453.63	446.10	418.61	361.00	334.10	287.98	279.44	241.74
3.00	637.95	536.76	460.15	453.57	446.39	418.59	361.11	334.16	288.41	279.43	241.66
4.00	637.94	536.90	460.06	453.20	446.70	418.48	361.26	334.22	288.70	279.40	241.54
5.00	638.00	537.00	459.30	.00	447.20	418.40	361.40	334.50	288.90	279.30	241.00

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: 86999
Certificate Number: 81061
Certificate Date: 2 January 2020
Verification Date: 2 January 2020

Page Number 3 of 3

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 Holmium oxide glass
Reference: Air
Scale: Absorbance
Range: 640 to 240 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 absorbance 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 discrepancy.

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:

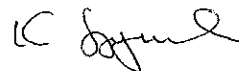
All reference materials are certified and supplied in a useable condition. There is no warranty for fitness beyond receipt by the customer. When references need to be re-certified or inspected for any reason, customers should return them to the Starna ISO/IEC 17025 & ISO 17034 accredited calibration 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 Technician - K. Szymanek MRSC

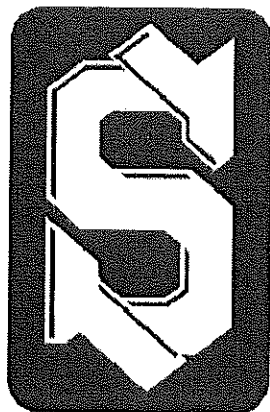
Approved Signatory:



Technical Manager - J. P. Hammond CSci CChem FRSC

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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.



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

RM-1N2N3N

Set Serial No: 30892

Customer Details:

Reactivos para Analisis S.A.C.
Av. Elmer Faucett No. 1837
Callao 2
Peru

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.





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

Email: sales@starna.com

Reference Material Certificate of Calibration and Traceability

Starna glass filters for use in the Visible region of the spectrum to verify the transmission and absorbance scales.

Starna Neutral Density Filter Set

Certificate Number: **81058**
Certificate Date: **2 January 2020**
Expiration Date: **2 January 2022**
Analysis file number: **10346**
Set Serial Number: **30892**
Blank Serial Number: **87184**



0659

Page Number 2 of 3

Description of Reference Material:

The reference filters are prepared from one of the following Schott optically neutral glass NG-3, NG-4, NG-5 or NG-11 depending on the nominal transmission required for each individual filter. Each filter is mounted in a black-anodized aluminium alloy holder, complete with front and rear slide cover.

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:

Each individual filter is measured against the empty filter holder (blank). The net absorbance and transmission values are measured at the wavelengths specified in the table below. The results and associated uncertainties at a coverage probability of 95 % as detailed below were obtained using the analytical procedures detailed in NIST Special Publication 260-140.

The combined analytical and instrument uncertainties at a coverage probability of 95 % is:

For Absorbance values less than 1.2 A (greater than 6.3 T/%) the expanded uncertainty = +/- 0.0027 A
For Absorbance value in the range 1.2 to 1.9 A (6.3 - 1.6 T/%) the expanded uncertainty = +/- 0.0052 A
For Absorbance value in the range 1.9 to 2.2 A (1.6 - 0.6 T/%) the expanded uncertainty = +/- 0.0059 A
For Absorbance value in the range 2.2 to 2.7 A (0.6 - 0.2 T/%) the expanded uncertainty = +/- 0.011 A
For Absorbance values greater than 2.7 A (Less than 0.2 T/%) the expanded uncertainty = +/- 0.019 A

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. (note net absorbance and transmission values can be measured at additional wavelengths if requested.)

Serial #	Wavelength (nm)	440.0	485.0	546.1	590.0	635.0
86704	Absorbance	1.0081	0.9513	1.0045	1.1145	1.0992
	%T	9.81	11.19	9.90	7.68	7.96
85439	Absorbance	0.7032	0.6641	0.7002	0.7754	0.7649
	%T	19.81	21.67	19.94	16.77	17.18
87013	Absorbance	0.5657	0.5278	0.5290	0.5632	0.5708
	%T	27.18	29.66	29.58	27.34	26.87

Set Serial Number: **30892**
Certificate Number: **81058**
Certificate Date: **2 January 2020**
Analysis Date: **2 January 2020**
Analysis file number: **10346**

Page Number 3 of 3

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:

Reference Material: NG-3, NG-4, NG-5 & NG-11 Optically Neutral Glass
Reference: Empty filter holder (air)
Scale: Transmission & Absorbance
Range: See Table on page 2.
Band width: 1 nm +/- 0.2nm
Temperature: 22 +/- 1.0 °C

Instructions for Use:

Remove the sliding window covers from both sides of each filter to be used. Place the empty (blank) filter holder in the blank cell holder in your instrument. Place the filters in the sample compartment as you would for any sample. Determine the absorbance of each filter against the supplied blank at each of the five listed wavelengths. Repeat several times.

To assess photometric accuracy, compare the mean, net absorbance or transmission reading for each filter 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.

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.

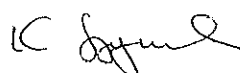
Storage and Care:

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.

Instrument Dependencies:

The instrument to be checked should have a spectral bandpass not exceeding 6.5 nm. Consult your instrument owners manual for this information.

Calibration performed by:



Calibration Technician - K. Szymanek MRSC

Approved Signatory:



Technical Manager - J. P. Hammond CSci CChem FRSC

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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.

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.