



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

**RM-HG**

**Set Serial 39619**

**Customer Details:**

Scientific Lab Equipment Service  
Room No.1  
PSC Buliding  
503 Veeraboyar Colony  
Dr.Nanjappa Road  
Coimbatore-641018

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.





**Calibration Lab.**  
**Starna Scientific Ltd**  
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## 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: **107693**  
 Certificate Date: **5 December 2022**  
 Expiration Date: **5 December 2024**  
 Analysis Number: **TBM140322**  
 Set Serial Number: **39619**  
 Cell Serial Number: **120530**



0659

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### 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 (> 3.0 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](http://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 642 to 218 nm. For each spectral bandwidth, a baseline correction is performed with an empty cell holder.

The 14 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	641.62	537.20	472.77	457.65	452.76	447.48	417.52	360.15	333.72	287.25	278.75	260.47	241.32	219.68
0.25	641.54	537.11	472.74	457.66	452.80	447.50	417.56	360.15	333.72	287.25	278.73	260.52	241.32	219.68
0.50	641.47	537.17	472.74	457.62	452.77	447.48	417.54	360.19	333.76	287.30	278.72	260.56	241.35	219.72
1.00	641.53	537.18	472.76	457.58	452.73	447.53	417.58	360.29	333.74	287.40	278.70	260.73	241.45	219.72
1.50	641.58	537.18	472.75	457.50	452.68	447.58	417.59	360.45	333.77	287.56	278.70	260.97	241.55	219.73
2.00	641.60	537.22	472.70	457.25	452.56	447.64	417.60	360.60	333.79	287.79	278.68	261.00	241.55	219.63
3.00	641.65	537.32	472.59	.00	452.02	448.04	417.60	360.85	333.79	288.00	278.61	261.02	241.47	219.47
4.00	641.76	537.49	472.19	.00	.00	448.99	417.67	360.95	333.72	288.06	278.50	260.89	241.31	.00
5.00	641.95	537.75	471.51	.00	.00	449.86	417.80	361.02	333.67	288.07	278.25	260.57	241.01	.00

Starna Cell Serial Number: **120530**  
Certificate Number: **107693**  
Certificate Date: **5 December 2022**  
Verification Date: **5 December 2022**

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**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: 642 to 218 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:

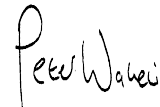
All reference materials are certified and supplied in a useable condition. There is no warranty for fitness beyond receipt by the customer. When references need to be re-certified or inspected for any reason, customers should return them to the Starna ISO/IEC 17025 & ISO 17034 accredited calibration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

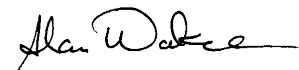
References should always be stored in the box provided and handled with extreme care. Filters are fragile and should be inserted and removed from the instrument taking care not to twist or apply leverage against the cell holder, as this may crack the filter. Damage in the form of scratches or contamination 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 - P. Wakelin RSciTech**

Approved Signatory:



**Calibration Manager - A. Wakelin CSci CChem MRSC**

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