



Ocean Optics, Inc.
Calibration Laboratories located in:
Winter Park, Florida, USA
Ostfildern, Germany

Certificate of Radiometric Calibration

Certificate Number: 24634

Date: 6/14/2018

Calibration Performed By:

OOI GMBH CAL LAB
MAYBACHSTRASSE 11
D-73760 OSTFILDERN, GERMANY

For:

OOI WP-STOCKROOM

Calibrated Equipment Information

Description: SPECTROMETER, UV-VIS

Model Number: FLAME-S-UV-VIS-ES

Serial Number: FLMS12526

Nomenclature: SPECTROMETER

Temp. / RH 24 C / 47 %

Cal. Interval: 12 MONTHS

Cal Date [MM/DD/YYYY]: 6/14/2018

Cal. Due Date: 6/14/2019

Manufacturer: OCEAN OPTICS INC.

Performed By: MUSTAFA SARIKAYA

Signature: 

Calibration Result: PASS

The calibration values in units [uJoule/counts] are stored on USB provided with this certificate.
As Found and As Left data are the same unless indicated otherwise in Calibration Notes

Calibration Notes

Calibration is voided if receptor is removed.

Standards Used To Calibrate Equipment

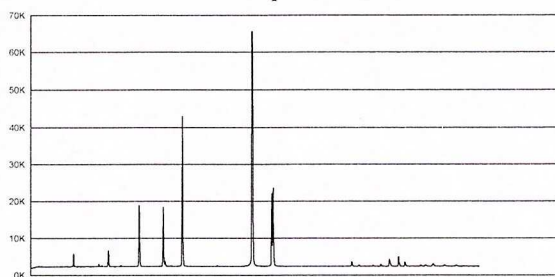
ID	Model Number	Description	Last Cal.	Cal. Due Date
08 248320002	LSN121	PRECISION POWER SUPPLY	4/21/2018	4/21/2019
16000002	OL 410-1000	PRECISION LAMP SOURCE		
17000090		CALIPER 500MM	2/27/2018	2/27/2021
F-1401	OL FEL-C	STANDARD OF SPECTRAL IRRADIANCE, 1000W Q1	10/17/2017	
H00314	LSK211	STANDARD LAMP, L.O.T. ORIEL 30W DEUTERIUM	8/7/2017	
Q556766	PCE-HT110	TEMPERATURE HUMIDITY RECORDER		

Procedures Used In This Event

Procedure	Title	Revision	Revision Date
MET.009	CAL OF SPECTROMETERS	7	4/1/2018

Ocean Optics Inc. is an ISO9001:2008 certified company. All radiometric calibrations were performed in compliance with National Institute of Standards & Technology practices recommended in NIST Handbook 150-2E, Technical Guide for Optical Radiation Measurements. All standards used are traceable to the National Institute of Standards & Technology; or an equivalent national organization, if the standard was calibrated outside the US; or have been derived from accepted values of naturally occurring physical constants. Ocean Optics Inc. responsibilities shall in no event, nor for cause whatsoever exceed the cost of the service represented. This report applies only to the item(s) identified above, at the time of calibration. This report shall not be reproduced, except in full, without written permission from Ocean Optics Inc.

Test Spectrum



Wavelength Calibration Data Sheet

Built for:
 Order Number:
 Model: **FLAME-S-UV-VIS-ES**
 Grating: GRATING_#1 - 600 Lines Blazed at 300 nm
 Bandwidth: 188 - 874 nm
 Options: DET2B-200-850 Detector, L2Lens, INTSMA-025 Slit,

Serial Number: **FLMS12526**

λ	Pixel #	Predicted λ	$\Delta\lambda$
228.802	131	228.857	-0.055
253.652	197	253.594	0.058
296.728	312	296.710	0.018
307.590	341	307.550	0.040
313.155	356	312.987	0.168
326.106	391	326.109	-0.003
328.233	397	328.229	0.004
334.148	413	334.226	-0.078
346.620	447	346.591	0.029
361.051	486	361.086	-0.035
365.015	497	365.077	-0.062
404.656	607	404.640	0.016
407.781	615	407.772	0.009
435.834	694	435.809	0.025
546.074	1011	546.179	-0.105
576.959	1102	577.065	-0.106
594.483	1154	594.532	-0.049
597.553	1163	597.587	-0.034
607.434	1192	607.473	-0.039
614.306	1213	614.347	-0.041
621.728	1236	621.768	-0.040
626.649	1250	626.682	-0.033
630.479	1262	630.488	-0.009
636.235	1280	636.268	-0.033
643.847	1303	643.851	-0.004
650.653	1324	650.659	-0.006
653.288	1332	653.282	0.006
659.895	1352	659.859	0.036
667.828	1376	667.796	0.032
671.704	1388	671.675	0.029
692.947	1454	692.903	0.044
696.543	1466	696.580	-0.037
727.294	1563	727.262	0.032
738.398	1598	738.391	0.007
763.511	1679	763.435	0.076
794.818	1781	794.812	0.006
805.950	1818	805.961	-0.011
811.531	1837	811.720	-0.189

This is a sample of calibration peaks used as there were more than can be shown on this page

Calibration Coefficients

First Coefficient: 0.3849975467
 Second Coefficient: -1.99563e-005
 Third Coefficient: -1.12405e-009
 Intercept: 178.67382813
 Regression Fit: 0.9999997020

Stray Light Measurements (AU)

Holmium Oxide (444nm): 1.62
 Yellow Dye: 2.29
 Blue Dye: 3.07
 Molybdate: 1.67
 OG550 Filter: 2.44
 RG850 Filter: 3.39
 FG3 Filter: 1.29

Ruby Pena

Calibrated By: Christian.Pardo
 Calibrated: 10-April-2018

Linearity Test

Serial Number **FLMS12526**

Tech: Christian.Pardo

Linearity: **99.80772**

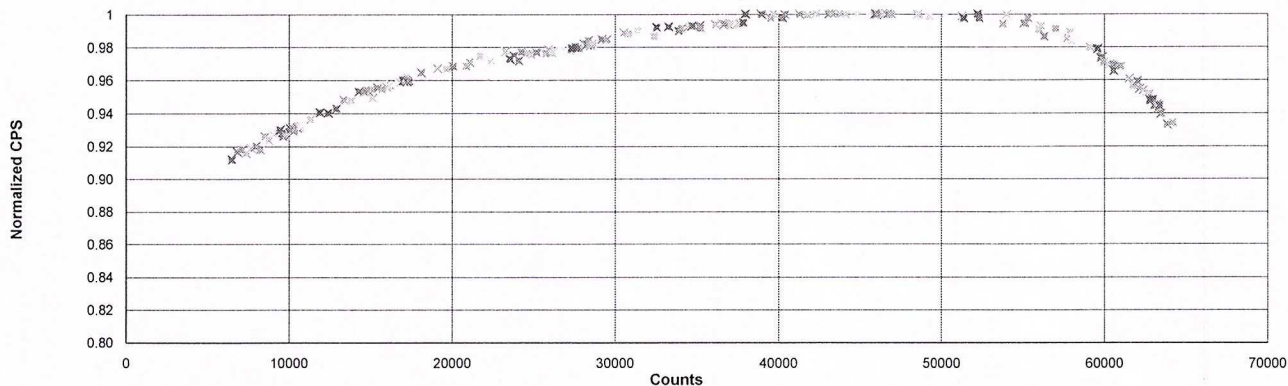
Tested: 4/10/18

Test # 196,225.00

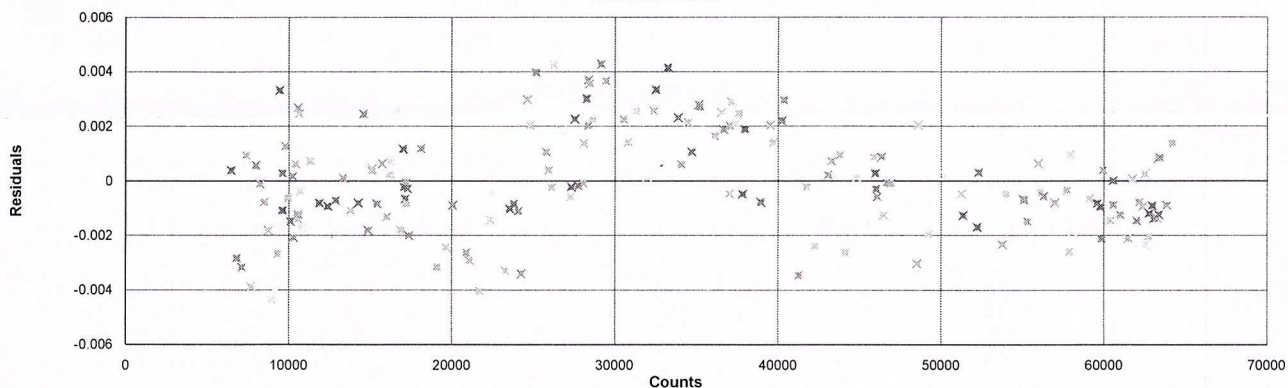
Intercept 0.872638
Coefficient 1 5.08302e-006
Coefficient 2 3.46525e-010
Coefficient 3 -4.11576e-014
Coefficient 4 1.76015e-018
Coefficient 5 -3.85987e-023
Coefficient 6 4.32783e-028
Coefficient 7 -1.98286e-033



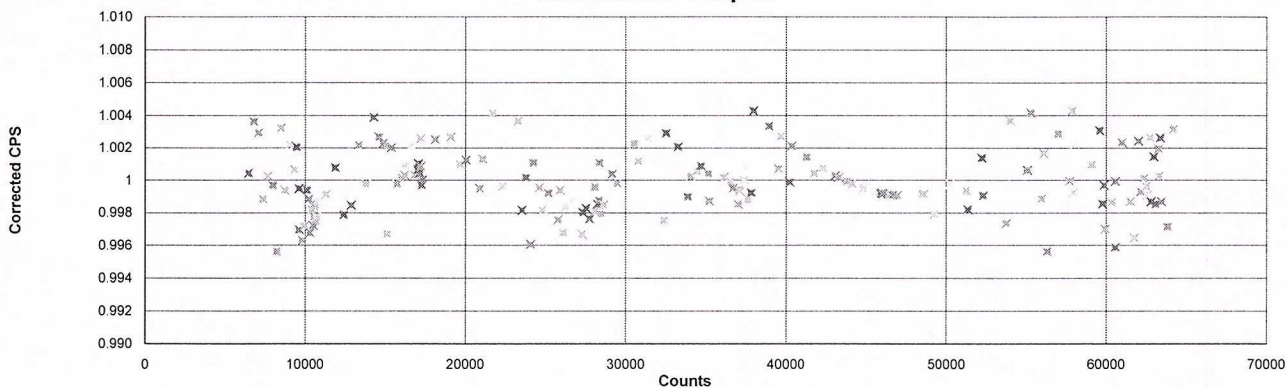
Normalized Output



Residuals



Linearized Output



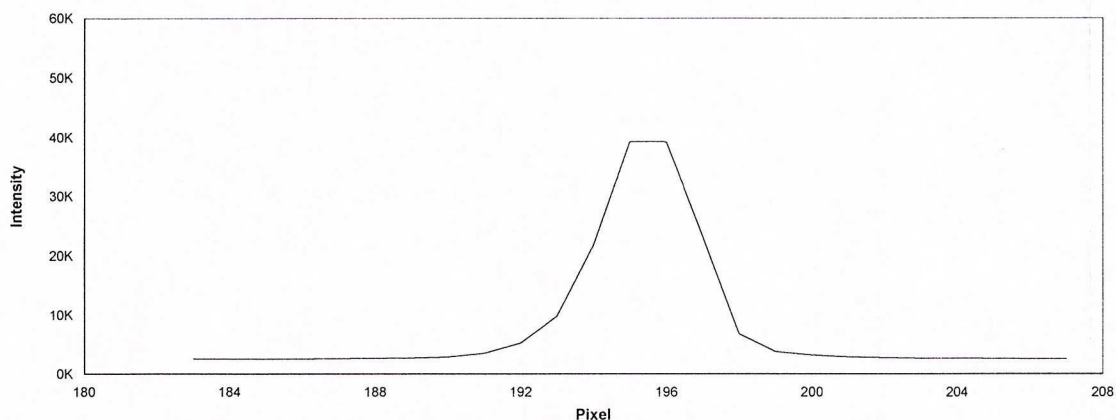
Max 1.00429600

Min 0.99560430

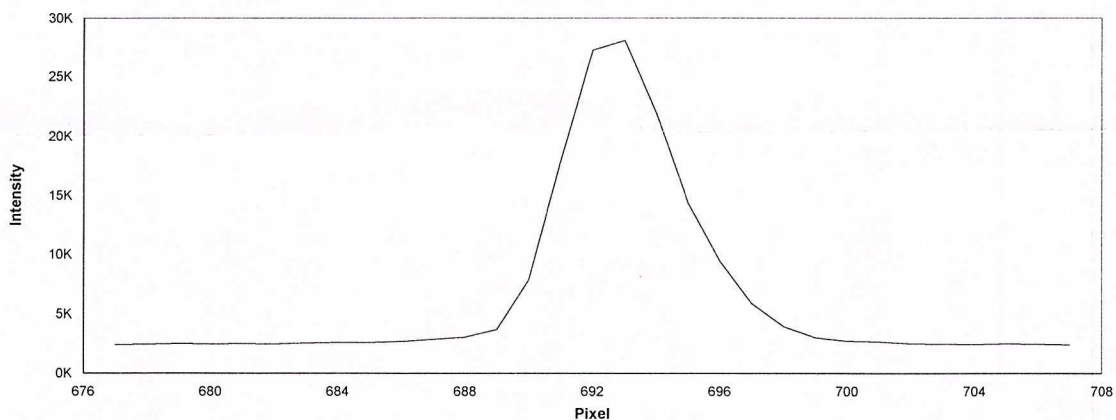
Resolution and Accuracy for FLMS12526



Result	FWHM in Pixels	Delta	Wavelength	Peak Source	Date
Passed	3.23	0.07	253.65	HG-1	4/10/18 9:57 am



Result	FWHM in Pixels	Delta	Wavelength	Peak Source	Date
Passed	4.16	-0.10	435.83	HG-1	4/10/18 9:57 am



Result	FWHM in Pixels	Delta	Wavelength	Peak Source	Date
Passed	4.20	-0.21	763.51	Ar	4/10/18 9:57 am

