

# Spectrometer test report



Serial number:  
SN1001-04-O-NIR-U-09-026

## Spectrometer description

Model	ANIR 0.9-2.6
Detector	G8423-03
Reference laser	PV85L0.9ST74-Z-0
Detector Thermalization	Uncooled
Test conditions	20 degC / 45% R.H.

## Test Conditions and Results

Parameter	unit	Specified value	value	Remark
Sensitivity	a.u.	N/A	N/A	Not specified yet
Contrast signal	%	>30	40	
Contrast laser	%	>30	40	
Data acquisition time	s	< 5	2.4 sec	
Effective measurement time	s	< 10	5 sec	
Stability full signal (12 hours)	%	<2	1	
Noise level low gain (max counts in detector band)	counts	< 10	3	
Noise level extreme gain (max counts in detector band)	counts	< 200	40	
Optical path difference	mm	> 1	1.3	
Resolution	cm <sup>-1</sup>	< 10	N/A	Not specified yet
Wavelength stability at 1500 nm (standard deviation)	cm <sup>-1</sup>	< 2	1	
Single measurement SNR at 1500 nm (full signal)	a.u.	500	1000	
SNR at 1500nm - 10 averages (interferrogram) (full signal)	a.u.	1000	N/A	Averaging is not possible on this instrument

For more information about the spectrometers or other products please contact us:

### ARCOPTIX S.A.

Chemin de Trois Portes 18  
2000 Neuchâtel  
Switzerland

[www.arcoptix.com](http://www.arcoptix.com)  
e.mail: [info@arcoptix.com](mailto:info@arcoptix.com)  
Tel.: +41 32 7310466  
Tel.: +41 32 7310463

Product Manager:

Signature:

# ARCspectro ANIR (900 nm to 2600 nm)

## Reflectivity Measurement

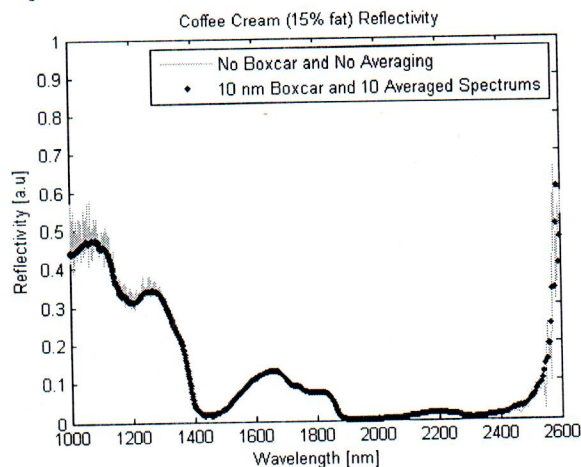
### Hardware Settings

- Coffee Cream with 15% fat
- Reference: Labsphere baseline sample (white). Serial number: 0D13F-4304
- Ocean optics probe: R600-7-VIS-125F
- ARCOptix FTS: ARCSpectro ANIR. Serial number: SN1001-04-O-NIR-U-09-026

### Software Settings (using the ARCSpectro ANIR software from ARCOptix)

- Detector Gain: Extreme
- Spectrum Averaging: 10
- Boxcar Width<sup>1</sup>: 10 nm

### Resulting Reflectivity



<sup>1</sup> The boxcar is a digital filter that averages each spectral sample with its neighboring bins ( $\pm 5$  nm). Lower frequency wavelength samples are more affected by this operation.

**PROFORMA INVOICE - OCE-PI-12-300C**
**Issuing Date:** 17-Sep-12  
**Expiry Date:** 17-Nov-12

**Bill to:**

 Instituto de Física de São Carlos  
 Av. Trabalhador São-carlense,400  
 São Carlos/SP 13566-590 BRASIL  
 CNPJ 63.025.530/0030-49  
 email: [importacao@ifsc.usp.br](mailto:importacao@ifsc.usp.br)
**Ship to:**

 Instituto de Física de São Carlos  
 Av. Trabalhador São-carlense,400  
 Attn: Prof. Lino Misoguti  
 São Carlos/SP 13566-590 BRASIL  
 CNPJ 63.025.530/0030-49  
 Email: [misoguti@ifsc.usp.br](mailto:misoguti@ifsc.usp.br)  
 Tel: 16 3373-8014

Item	Reference	Qty	Description	NCM	Unit USD	Total USD
1	ANIR-900-2600	1	Fourier Transform Spectrometer, 900-2600 nm	9027 3019	20.381,00	20.381,00
	SpectraSuite	1	Cross-platform Spectroscopy Operating Software			
2	HR4000CG-UV-NIR-CUST-3	1	HR4000-CG-UV-NIR - Composite-grating miniature fiber optic high resolution Spectrometer, range 200-1100nm, assembled with grating #HCL, Slit 25um, DET4-200-1100. Supplied with:		5.973,00	5.973,00
3	DH-2000-BAL	1	Balanced Deuterium Tungsten Source, 210-1700nm, 1000 hrs (KB)		4.239,00	4.239,00
4	P400-2-SR	2	400um Fiber, solarization-resistant, 2m (KB)		150,00	300,00
5	BIF400-UV-VIS	1	400 u m Bifurcated Fiber, UV/VIS, 2m (ATO)		323,00	323,00
6	QR200-REF-UV-VIS	1	Premium 200um Refl. Probe, UV/VIS, 2 m, reference leg (ATO)		635,00	635,00
7	74-UV	2	UV/VIS Collimating Lens, 200-2000 nm		184,00	368,00
8	CUV-UV	1	Cuvette Holder, 1-cm path, 200-2000 nm		461,00	461,00
9	CUV-UV-FL	1	Cuvette Holder, 1-cm path, for fluorescence, 200-2000 nm		577,00	577,00
10	FOIS-1	1	Fiber Optic Integrating Sphere for emission		646,00	646,00
11						
<b>Internal freight</b>					120,00	120,00
					<b>Total FCA (USD)</b>	<b>34.023,00</b>

**Payment Terms:** NET 10 Days  
**Country of Origin:** USA  
**Place of Shipment:** Dunedin - Florida  
**Delivery Time:** 4 to 6 weeks  
**Validity of Proforma:** 90 days from date of issue  
**Warranty:** 12 months from date of invoicing on parts and labor.  
**Total Net Weight:** 4,00 Kg  
**Total Gross Weight:** 8,00 Kg  
**Brazilian Representative:** US Biosolutions Brasil - CNPJ 05.775.415/0001-50  
**Address:** R. Paulino Vital de Moraes, 216 - São Paulo - Fone/Fax 11 5512 8436 - SP.  
**Contact:** Mr. Carlos Gomes - email: [cgomes@usbio.com.br](mailto:cgomes@usbio.com.br) - Tel 11 8292 2529  
**Manufacturer:** Ocean Optics Inc  
**Address:** 4301 Metric Drive - Winter Park, FL 32792 USA  
**Exporter:** Ocean Optics Inc  
**Exporter Address:** 830 Douglas Ave. Dunedin FL 34698  
**Exporter Bank details:** Account Name: Ocean Optics, Inc  
 FIFTH THIRD Bank  
 Swift Code # FTBCUS3C  
 Account# 7421250635  
 Bank Address: 505 Kingsley Drive  
 Madisonville, OH 45227

 Signed: \_\_\_\_\_  
 Ocean Optics

# Linearity Test

Serial Number **HR4C5405**

Tech: Beverly.Dulac

Intercept 0.969484  
Coefficient 1 7.9354e-006  
Coefficient 2 1.29508e-009  
Coefficient 3 -8.78509e-013  
Coefficient 4 1.68916e-016  
Coefficient 5 -1.61195e-020  
Coefficient 6 7.64534e-025  
Coefficient 7 -1.44121e-029

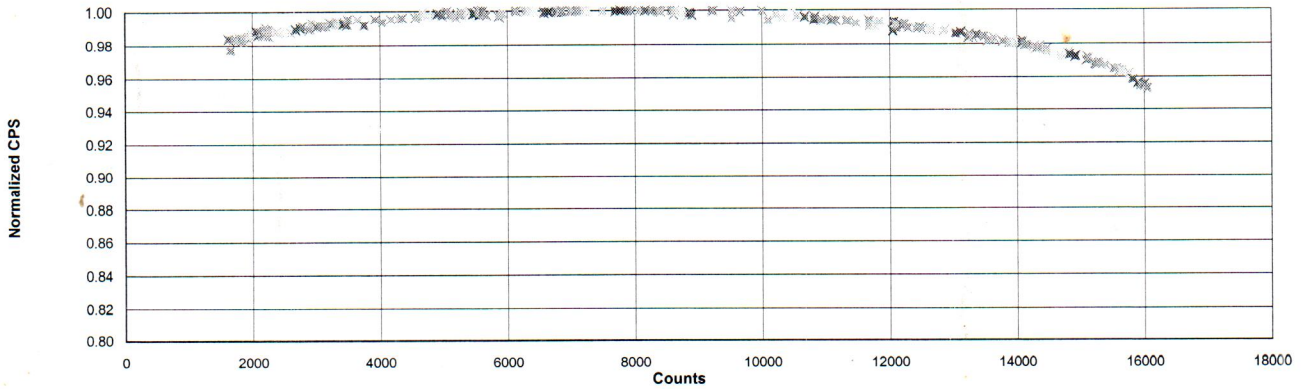


Linearity: **99.88318**

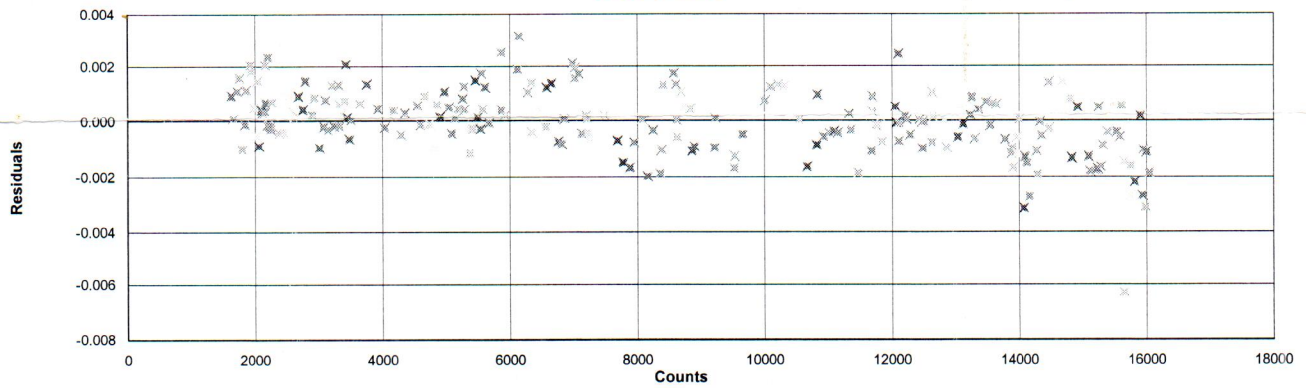
Tested: 10/4/12

Test # 70,142.00

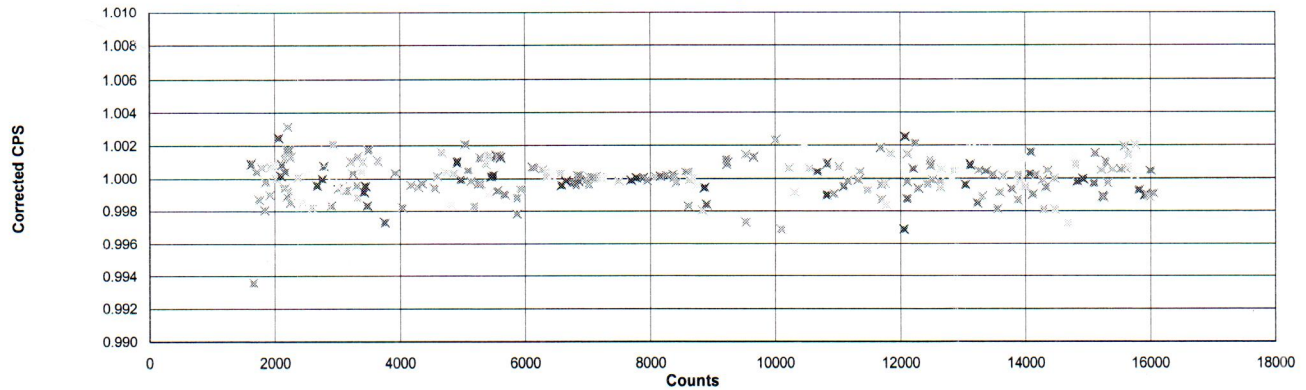
### Normalized Output



### Residuals



### Linearized Output

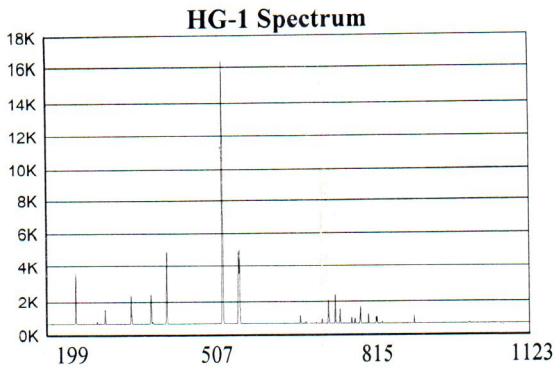


Max 1.00317514

Min 0.99357516



Wavelength Calibration Data Sheet



Built for: Instituto de Física de São Carlos/USP  
 Order Number: 636406  
 Model: HR4000  
 Grating: GRATING\_#HC1 - 300 Line Composite Blaze  
 Bandwidth: 199 - 1123 nm  
 Options: DET4-200-1100 Detector, NoneLens, SLIT-25 Slit,

Serial Number: HR4C5405

$\lambda$	Pixel #	Predicted $\lambda$	$\Delta\lambda$
253.652	220	253.849	-0.197
296.728	381	296.725	0.003
365.015	637	365.023	-0.008
404.656	787	404.516	0.140
435.835	905	435.746	0.089
467.816	1028	467.804	0.012
468.014	1028	468.007	0.007
472.216	1045	472.229	-0.013
481.053	1078	481.078	-0.025
546.074	1329	546.162	-0.088
640.225	1694	640.236	-0.011
653.288	1745	653.300	-0.012
667.828	1802	667.840	-0.012
671.704	1817	671.701	0.003
692.947	1900	692.968	-0.021
696.543	1914	696.570	-0.027
717.394	1996	717.373	0.021
724.516	2024	724.494	0.022
727.294	2035	727.268	0.026
738.398	2079	738.429	-0.031
750.387	2127	750.394	-0.007
753.577	2139	753.603	-0.026
763.510	2179	763.439	0.071
772.421	2214	772.344	0.077
794.318	2301	794.323	-0.005
794.817	2303	794.799	0.018
800.616	2327	800.811	-0.195
823.163	2416	823.138	0.025
826.324	2429	826.311	0.013
826.452	2430	826.423	0.029
829.811	2443	829.797	0.014
837.760	2475	837.777	-0.017
842.465	2494	842.425	0.040
849.535	2522	849.553	-0.018
852.144	2532	852.046	0.098
877.675	2636	877.685	-0.010
912.297	2775	912.239	0.058
922.450	2817	922.424	0.026

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

**Calibration Coefficients**

First Coefficient: 0.2699989080  
 Second Coefficient: -3.90714e-006  
 Third Coefficient: -7.29196e-011  
 Intercept: 194.53167725  
 Regression Fit: 0.9999998212

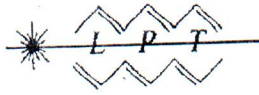
**Stray Light Measurements (AU)**

Holmium Oxide (444nm): 1.76  
 Yellow Dye: 2.27  
 Blue Dye: 3.12  
 Molybdate: 1.45  
 OG550 Filter: 2.30  
 RG850 Filter: 3.63  
 FG3 Filter: 1.32

**Cielo Gonzalez**

Calibrated By: Beverly.Dulac  
 Calibrated: 04-October-2012

Laser  
Needs



Laser Photonics Technology, Inc.

Laser Photonics Technology, Inc.  
640 Ellicott Street - Suite 499,  
Buffalo, NY 14203, USA  
Phone: 716 253 1917  
Fax: 716 645 6945  
Fed. Tax ID: 16-1380149  
Contact: Aliaksandr Kachynski

June 5, 2013

### PACKING LIST

Customer PO # 0012/2013

**Deliver and Bill to:**

Universidade de Sao Paulo, Instituto de Fisica de Sao Carlos  
Av. Trabalhador sao-carlense, 400  
13566-590, Sao Carlos- SP- BRASIL  
Import Licence: Dispensed/Law 8010/90

ITEM #	DESCRIPTION	HARMONIZED CODE	QTY
	<b>Education Laser Kit (option 1) with the following components:</b>	<b>902300</b>	one set
LK001	Pump laser diode with thermoelectric cooler and pump optics attached to microprocessor-controlled power supply.		1
LK002	Nd:KGW laser crystal in a holder with rear mirror on the end.		1
LK003	Set of concave cavity mirrors (output coupler for 1067nm, 533.5 nm, and 1180 nm).		1
LK004	Passive Q-switch crystal at magnetic holder (Cr:GSGG crystal, AR/AR-coated).		1
LK005	SHG/KTP nonlinear crystal dual wavelength AR coated in a holder.		1
LK006	Honeycomb breadboard		1
LK007	Optical rail		1
LK008	Mirror/crystal mounts		2
LK009	Laser Safety goggles.		1
LK010	IR-to-Visible radiation converter.		2
LK011	Dust/Radiation Acrylic Protective Cover		1
LKE01	Red Laser Diode with holder		1
LKE03	Photodetector SM05		1
LKE06	Optical filter set (3 filters) LP 850 nm, LP1100 nm, SP 600 nm		1
	Laser kit manual with 9 laboratory exercise instructions on CD		1

640 Ellicott Street - Suite 499,  
Buffalo, NY 14203, USA  
tel. 716 253 1917, fax 716 645 6945





Laser

June 5, 2013

Laser Photonics Technology, Inc.  
 Photonics Technology, Inc.  
 640 Ellicott Street - Suite 499,  
 Buffalo, NY 14203, USA  
 Phone: 716 253 1917  
 Fax: 716 645 6945  
 Fed. Tax ID: 16-1360149

**INVOICE # 0909**

Customer PO # 0012/2013

Deliver and Bill to:

Universidade de Sao Paulo, Instituto de Fisica de Sao Carlos  
 Av. Trabalhador sao-carlense, 400  
 13566-590, Sao Carlos- SP- BRASIL  
 Import Licence: Dispensed/Law 8010/90

ITEM #	DESCRIPTION	HARMONIZED CODE	QTY	TOTAL US\$
1	<b>Education Laser Kit (option I) (components listed below)</b>	902300	1	
	LK001 Pump laser diode with thermoelectric cooler and pump optics attached to microprocessor-controlled power supply.		1	
	LK002 Nd:KGW laser crystal in a holder with rear mirror on the end.		1	
	LK003 Set of concave cavity mirrors (output coupler for 1067nm, 533.5 nm, and 1180 nm).		1	
	LK004 Passive Q-switch crystal at magnetic holder (Cr:GSGG crystal, AR/AR-coated).		1	
	LK005 SHG/KTP nonlinear crystal dual wavelength AR coated in a holder.		1	
	LK006 Honeycomb breadboard		1	
	LK007 Optical rail		2	
	LK008 Mirror/crystal mounts		1	
	LK009 Laser Safety goggles.		2	
	LK010 IR-to-Visible radiation converter.		1	
	LK011 Dust/Radiation Acrylic Protective Cover		1	
	LKE01 Red Laser Diode with holder		1	
	LKE03 Photodetector SM05		1	
	LKE06 Optical filter set (3 filters)		1	
	Laser kit manual with 9 laboratory exercise instructions on CD			
			<b>Subtotal, US\$</b>	<b>14,270</b>
<b>Net Weight : 25.9 kg;</b>			<b>Handling and packaging:</b>	<b>450</b>
<b>Gross Weight: 46.0 kg</b>			<b>Total Incoterms FCA US\$</b>	<b>14,720</b>

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 Buffalo, NY 14203, USA  
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