

**Avantes Calibration Certificate**

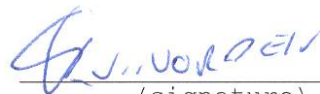
Model : AvaSpec-2048  
Description : Fiber Optic Spectrometer, 75 mm AvaBench,  
2048 pixel CCD detector, USB/RS-232 interface  
Grating : UA - 300 lines/mm  
Bandwidth : from 178 nm to 1100 nm  
Options Installed : UV400-coating, DCL-UV/VIS, Slit-100, OSC-200-1100  
Serial Number : 0407026S1 Master

Pixel #	Present $\lambda$	Standard $\lambda$	$\Delta\lambda$
126.8	253.52	253.65	-0.13
226.2	312.67	312.57	0.10
314.7	365.03	364.82	0.21
382.0	404.66	404.66	0.00
434.9	435.69	435.84	-0.15
624.5	546.00	546.08	-0.08
905.5	706.71	706.72	-0.01
942.0	727.33	727.29	0.04
961.4	738.26	738.40	-0.14
1006.3	763.50	763.51	-0.01
1022.3	772.47	772.40	0.07
1062.3	794.84	794.82	0.02
1119.2	826.53	826.45	0.08
1165.4	852.15	852.14	0.01
1274.6	912.27	912.30	-0.03
1293.2	922.45	922.45	0.00
1372.8	965.82	965.78	0.04
1461.8	1013.91	1013.98	-0.07
1608.4	1092.18	1092.16	0.02

**Calibration Coefficients**

Intercept : 1.775794585E+002  
First Coefficient : 6.009772471E-001  
Second Coefficient : -1.610026776E-005  
Third Coefficient : -2.490332449E-009  
Fourth Coefficient : 0.000000000E+000  
Standard Deviation : 0.09691  
Correlation Coefficient : 0.999999937

29/07/2004  
(date)

  
(signature)