

Solo VPE - Pathlength Accuracy

The pathlength of the VPE is defined by the position of the probe tip to the bottom of the sample container. It is important to know the exact probe tip positions in each pathlength scans. To verify the probe tip position, a Potassium Dichromate standard solution, prepared by GFS Chemicals Co., was used for the pathlength accuracy test. The standard solution was measured in cuvettes with different pathlengths, such as 1mm, 2mm, 5mm, and 10mm cuvette. The same standard solution was then used for VPE scan. VPE was setup to scan the solution from 1mm to 10mm with 1mm scan step. The results of both measurements are listed below. The percentage of deviations of the two set of data is also presented in following table.

Absorbance Data from GFS and VPE

Pathlength	GFS				VPE			
	Wavelength (nm)				Wavelength (nm)			
mm	350.1	313.0	257.0	235.0	350.1	313.0	257.0	235.0
	Abs	Abs	Abs	Abs	Abs	Abs	Abs	Abs
1	0.1039	0.0452	0.1434	0.1244	0.1066	0.0477	0.1432	0.1259
2	0.214	0.0955	0.2883	0.2463	0.2142	0.0975	0.2880	0.2506
5	0.5315	0.2409	0.7173	0.6141	0.5385	0.2451	0.7254	0.6312
10	1.0682	0.4836	1.4444	1.2346	1.0712	0.4876	1.4229	1.2840

Pathlength Accuracy

Pathlength	Wavelength (nm)			
	350.1	313.0	257.0	235.0
	Abs	Abs	Abs	Abs
1 mm	2.6%	5.6%*	-0.2%	1.2%
2 mm	0.1%	2.1%	-0.1%	1.7%
5 mm	1.3%	1.8%	1.1%	2.8%
10 mm	0.3%	0.8%	-1.5%	4.0%

* GFS reported max. $\pm 5\%$ error in low absorbance range.

Absorbance Linearity

Potassium Dichromate Standard
Linearity

