



## Technical Specification for UV-Vis-NIR Spectrophotometer

The specification covers minimum requirements for the procurement of UV-Vis-NIR spectrophotometer, used for generating the spectra, absorption/transmission measurements inorganic and organic compounds of aerosol and BrC etc. in aerosol extracted in water/organic solvents (but not limited to these applications).

Sl. No.	Feature	Description
1	General	<ul style="list-style-type: none"><li>i. The instrument should be self-sufficient and complete in all respect.</li><li>ii. The system should be compatible and rugged.</li><li>iii. The instrument must have electrical compatibility with the Indian power outlet in terms of voltage, phase and current.</li><li>iv. Bidder should specify/quote mandatory parts and accessories.</li><li>v. Bidder should quote all the spare parts required for smooth functioning of the equipment at least for three years.</li></ul>
2	Scan Mode	<ul style="list-style-type: none"><li>i. System should have ultra-low stray light, ratio recording which should work in Transmission, Reflection and Absorption mode, Absorbance, % Transmittance, % Reflectance, Concentration</li><li>ii. Scanning, Quantitative analysis, Kinetics experiment</li><li>iii. Double beam; double monochromator</li><li>iv. Should hold multiple (minimum 6 or more), 10 mm standard (3 ml ) rectangular cells and (6 or more) Micro (300-700 <math>\mu</math>l) Multi-cell holder with similar/constant optical path length, Constant Temperature type</li></ul>
3	Ambient Temperature	15– 35 Deg. C
4	Ambient Humidity	35-80% (no condensation, less than 70% at temp. above 30°C )
5	Temperature controller	<ul style="list-style-type: none"><li>i. Use in multi sample and reference position for all samples</li></ul>

		<p>simultaneously (i.e. for 6 or more samples and reference simultaneously)</p> <p>ii. Auto software recognition &amp; alignment</p> <p>iii. Peltier (electronic) temperature controller (20 to 60°C)</p> <p>iv. Measure multi-cell kinetics</p>
6	Wavelength Range	190 – 3300 nm
7	Spectral Bandwidth	<p>i. 0.2 - 5.00 nm (UV-Vis)</p> <p>ii. 0.2 - 20 nm (NIR)</p>
8	Light Source	<p>i. Halogen /Deuterium or Tungsten Halogen lamp.</p> <p>ii. Software selectable switchover of lamps from UV to Visible range</p> <p>iii. Automatic adjustment of light source position</p>
9	Detector	<p>i. High performance Photomultiplier detector for UV visible region.</p> <p>ii. InGaAs and Cooled PbS detector for NIR region</p>
10	Wavelength Accuracy	+/- 0.2 nm (UV), +/- 0.8 (NIR). Or better
11	Wavelength Repeatability	+/- 0.08 nm UV (SD of 10 measurements), +/- 0.35 NIR. Or better
12	Wavelength Scanning Speed	<p>i. UV-Vis 4500 nm/min</p> <p>ii. NIR PbS 4000 nm/min</p> <p>iii. PMT/InGaAs 9000 nm/min</p> <p>Or better</p>
13	Photometric Display Value Range	$\pm 6\text{abs}$ or better
14	Photometric Accuracy	1A: $\pm 0.003\text{A}$ ; 0.5A: $\pm 0.002\text{A}$ or better
15	Stray Light	<p>0.00008 @ 220 nm;</p> <p>0.0005%T @1420 nm;</p> <p>0.005%T @2365nm Or better</p>
16	Performance verification	Should have inbuilt performance verification programme with limits mentioned as a standard feature in software
17	Connectivity	System should be PC controlled (with USB ports), to support flash memory for method and data storage.
18	PC	Bidder should provide PC configuration with compatible Operation System and Microsoft Office.
19	Software	<p>i. Should have instrument control software including: wavelength scanning, single and multiple fixed wavelength, wavelength ratios, quantitative analysis and for running customized method scripts; Kinetics with time scan.</p> <p>ii. Should have multitasking options with all spectral &amp;</p>

		<p>mathematical functions</p> <p>iii. Should be able to transfer data in excel or csv format</p>
20	Cuvettes	<p><b>i.</b> 10mm quartz cuvettes with lid for complete UV-Vis-NIR range</p> <p><b>ii.</b> Minimum 4 pair should be supplied (both regular-3ml and micro-200 to 700 µl)</p> <p><b>iii.</b> Additional 4 pairs both regular and micro to be quoted as separate line item.</p>
21	Warranty	<p><b>i.</b> Bidder should mention warranty for consumables and instrument separately.</p> <p><b>ii.</b> Bidder should provide minimum 1 year warranty on complete instrument.</p> <p><b>iii.</b> Bidder should quote for additional 2 years warranty as separate line item.</p>
22	Sampling flexibility	<p>System should have capability to accommodate wide range of accessories like Integrating sphere, automated variable angle specular reflectance, gas sampling cells, fiber optic probe, Third party accessories etc.</p>
23	Other Terms	<p><b>i.</b> Bidder should demonstrate the quoted system for the user's samples within stipulated time frame (during technical evaluation).</p> <p><b>ii.</b> Bidder should provide complete set of technical and operational manual during bid submission.</p> <p><b>iii.</b> Bidder should clearly specify pre-requisites for installation and operation.</p> <p><b>iv.</b> Bidder should provide at no additional cost, operational training for minimum 2 personnel at the user's lab, after installation.</p>