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).

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>General</td>
<td>i. The instrument should be self-sufficient and complete in all respect.</td>
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<td>ii. The system should be compatible and rugged.</td>
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<td>iii. The instrument must have electrical compatibility with the Indian power outlet in terms of voltage, phase and current.</td>
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<td>iv. Bidder should specify/quote mandatory parts and accessories.</td>
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<td>v. Bidder should quote all the spare parts required for smooth functioning of the equipment at least for three years.</td>
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<td>2</td>
<td>Scan Mode</td>
<td>i. System should have ultra-low stray light, ratio recording which should work in Transmission, Reflection and Absorption mode, Absorbance, % Transmittance, % Reflectance, Concentration</td>
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<td></td>
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<td>ii. Scanning, Quantitative analysis, Kinetics experiment</td>
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<td>iii. Double beam; double monochromator</td>
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<td>iv. Should hold multiple (minimum 6 or more), 10 mm standard (3 ml) rectangular cells and (6 or more) Micro (300-700 µl) Multi-cell holder with similar/constant optical path length, Constant Temperature type</td>
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<td>3</td>
<td>Ambient Temperature</td>
<td>15–35 Deg. C</td>
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<td>4</td>
<td>Ambient Humidity</td>
<td>35-80% (no condensation, less than 70% at temp. above 30°C)</td>
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<td>5</td>
<td>Temperature controller</td>
<td>i. Use in multi sample and reference position for all samples</td>
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<td><strong>6</strong></td>
<td>Wavelength Range</td>
<td>190 – 3300 nm</td>
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</table>
| **7** | Spectral Bandwidth | i. 0.2 - 5.00 nm (UV-Vis)  
ii. 0.2 - 20 nm (NIR) |
| **8** | Light Source | i. Halogen /Deuterium or Tungsten Halogen lamp.  
ii. Software selectable switchover of lamps from UV to Visible range  
iii. Automatic adjustment of light source position |
| **9** | Detector | i. High performance Photomultiplier detector for UV visible region.  
ii. InGaAs and Cooled PbS detector for NIR region |
| **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 | i. UV-Vis 4500 nm/min  
ii. NIR PbS 4000 nm/min  
iii. PMT/InGaAs 9000 nm/min  
Or better |
| **13** | Photometric Display Value Range | ±6abs or better |
| **14** | Photometric Accuracy | 1A: ± 0.003A; 0.5A: ± 0.002A or better |
| **15** | Stray Light | 0.00008 @ 220 nm;  
0.0005%T @1420 nm;  
0.005%T @2365nm Or better |
| **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 | 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.  
ii. Should have multitasking options with all spectral & |
### 20 Cuvettes

- **i.** 10mm quartz cuvettes with lid for complete UV-Vis-NIR range
- **ii.** Minimum 4 pair should be supplied (both regular-3ml and micro-200 to 700 µl)
- **iii.** Additional 4 pairs both regular and micro to be quoted as separate line item.

### 21 Warranty

- **i.** Bidder should mention warranty for consumables and instrument separately.
- **ii.** Bidder should provide minimum 1 year warranty on complete instrument.
- **iii.** Bidder should quote for additional 2 years warranty as separate line item.

### 22 Sampling flexibility

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.

### 23 Other Terms

- **i.** Bidder should demonstrate the quoted system for the user’s samples within stipulated time frame (during technical evaluation).
- **ii.** Bidder should provide complete set of technical and operational manual during bid submission.
- **iii.** Bidder should clearly specify pre-requisites for installation and operation.
- **iv.** Bidder should provide at no additional cost, operational training for minimum 2 personnel at the user’s lab, after installation.