



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai - 400076

PR No. 1000029451

Rfx No. 6100001277

Technical Specifications for UV/VIS/NIR Spectrophotometer

A) UV-VIS NIR SPECTROPHOTOMETER

1) PC based variable bandwidth spectrophotometer with following minimum specification. The spectrophotometer should be GLP/GMP compliance.

- a) Optical system : i. Czerny-Turner mount Single monochromator
Fully symmetrical double beam type.
- b) Monochromator : i. Plane Czerny turner type with
1200 grooves/mm
- c) Light Source : i. D2 Lamp & Halogen lamp
- d) Wavelength Range : i. 190 to 3200 nm
- e) Wavelength Accuracy : i. ± 0.4 nm (at 656.1 nm) ± 1.5 nm (at 1312.2 nm)
- f) Wavelength Repeatability : i. ± 0.06 nm (UV-Vis), ± 0.2 nm (NIR)
- g) Spectral Bandwidth : i. UV-Vis: 0.1, 0.2, 0.5, 1, 2, 5, 10 nm
ii. L2, L5, L10 nm (low stray light mode)
iii. M1, M2 nm (micro cell mode)
iv. NIR: 0.4, 0.8, 1, 2, 4, 8, 20, 40
v. L8, L20, L40 nm (low stray light mode)
vi. M4, M8 nm (micro cell mode)
- h) Stray light : i. 1% (198 nm KCL 12 g/L aqueous solution)
ii. 0.005% (220 nm NaI 10 g/L aqueous solution)
iii. 0.005% (340 nm NaNO₂ 50 g/L aqueous solution)
iv. 0.005% (370 nm NaNO₂ 50 g/L aqueous solution)
v. SBW: L2 nm
vi. 0.04% (1420 nm: H₂O)
vii. 0.1% (1690 nm: CH₂Br₂ 50 mm cell)
SBW: L8 nm
- i) Photometric Range : i. UV-Vis: -4~4 Abs
ii. NIR: -3~3 Abs
- j) Photometric Accuracy : i. ± 0.0016 Abs (0 to 0.5 Abs)
ii. ± 0.0026 Abs (0.5 to 1 Abs) ± 0.3 %T
iii. Tested with NIST SRM 930D



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- k) Photometric Repeatability : i. ± 0.0006 Abs (0 to 0.5 Abs)
ii. ± 0.0006 Abs (0.5 to 1 Abs)
iii. Tested with NIST SRM 930D
- l) Scanning speed : i. Variable Min 10 nm/min Max 4000 nm/min
(8000 min in preview mode)
- m) Slew speed : i. UV Vis: 12,000 nm/min
ii. NIR: 48,000 nm/min
- n) RMS Noise : i. 0.00005 Abs (0 Abs, wavelength: 500 nm, measurement time: 60 sec, SBW : 2)
- o) Baseline stability : 0.0004 Abs/hour
- p) Baseline flatness : ± 0.0002 Abs (200 - 2500 nm)
- q) Detector : i. Photomultiplier tube, Peltier cooled PbS
- r) Connectivity : i. USB 2
- s) Power requirements : i. 220V

- t) Warranty : i. One Year

- u) Quantity : 1 No.

2) Integrating Sphere (UV/VIS/NIR)

- a. - Inside dia. of Integrating Sphere : 60 mm ϕ
- b. - Incident Angle to reflection surface : 0° , approx. 5°
- c. - Min. sample size (reflection) : 20(H) \times 20(W) \times 0.5(t) mm
- d. - Max. sample size (reflection) : 65(H) \times 50(W) \times 25(t) mm
- e. - Wavelength range : 200 - 2500 nm (V-770)

3) Peltier Temperature Cell Holder:

- a) Cell : Sample Side : 10 mm path length rectangular cell
- b) Reference side : 10 mm path length rectangular cell
- c) Temperature
Control System : Heating/cooling system utilizing Peltier effect. Only the sample side temperature can be controlled.
- d) Heat radiating system : Water Cooled.
- e) Stirring System : Magnetic stirrer (with variable stirring speed control)
- f) Temperature Setting range : -10 to 100 deg C
- g) Temperature Control range : 0 to 100 deg C (for cooling water temp. at 20 deg C)
- h) Temperature Control Accuracy : ± 0.1 deg C (Cell holder sensor)
- i) Temperature Accuracy : With cell holder sensor: ± 0.5 deg C (20 deg C to 40 deg C)



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j) Interface with PC : USB 2.0

4) Measurement modes, Quantitative Analysis

Wavelength scan (Abs, %T, %R, Sample, Reference), Time scan (Abs, %T, %R, Sample, Reference), Fixed wavelength (Up to 8 wavelengths), Abs/%T monitor

5) Data processing:

Peak picking, Peak height, Peak area, Peak width, Derivatives, Smoothing, Data truncation, Arithmetic, Baseline correction, Subtraction, Deconvolution, Vertical axis conversion, Horizontal axis conversion

6) Other standard functions:

Validation Software, Enzyme activity calculation JASCO Canvas, Film thickness measurement, Color analysis, Daily maintenance, Two wavelengths time course measurement (only for PC)

B) SPECTROFLUOROMETER

TENDER SPECIFICATIONS FOR PC CONTROLLED HIGH SENSITIVE SPECTROFLUOROMETER

- 1) Light source : Xe lamp with shielded amp house, 150W (long life 3000 Hr.)
- 2) Light Source (for Validation) : Integrated, selectable low-pressure mercury lamp
- 3) Photometric system : Ratio Photometer system: using Monochromatic light to monitor The intensity output of the Xe lamp
- 4) Monochromator : Holographic concave grating in modified Rowland mount
- 5) Wavelength range : Ex/Em: Zeroorder, 200-750nm
- 6) Sensitivity (RMS) : 4,500:1
- 7) Resolution: Ex / Em : 1.0nm (at 546.1nm)
- 8) Bandwidth: Ex / Em : 1, 2.5, 5, 10, 20nm
- 9) Wavelength accuracy : ± 1.5 nm
- 10) Wavelength Repeatability : ± 1.0 nm



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- 11) Wavelength scan speed : Variable Min 20nm/min Max 20,000nm/min Ex : Em
- 12) Slew Speed : 30,000nm /min
- 13) Response : 10, 20, 50, 100, 200, 500 msec, 1, 2, 4, 8 sec
- 14) Detector : Ex: Silicon photodiode, Em: PMT
- 15) Photometric Range : -10,000 - 10,000
- 16) Sensitivity Selection : High, Medium, Low, Very Low, Manual, Auto SCS
- 17) Auto Gain : Standard
- 18) Shutter Function : Standard (Automatic control)
- 19) Sample Illuminating System : Horizontal illumination
- 20) Sample Compartment : 10 mm rectangular cell holder, Nitrogen purgeable
- 21) Recognition of IQ Accessory : Automatic & Standard
- 22) Start Button : Standard
- 23) Instrument Communication : USB 2.0
- 24) Measurement programs,
Control & Analysis S/W : i. Spectra measurement,
ii. Quantitative measurement,
iii. Fixed wavelength measurement,
iv. Time course measurement,
v. Daily Performance Check
Validation Program
- Abs measurement
- 25) Spectra correction program : Standard (Need Required Stds & Accessories)
- 26) Instrument validation : Program and Hg lamp (Standard) Accessories (option)
- 27) Warranty : One year
- 28) Quantity : 4 Nos.
- 29) Future Compatibility: Peltier Temp controller -10 to 110 degC Solid/Powder sample holder



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C) UV-VIS SPECTROPHOTOMETER

PC based UV-VIS Spectrophotometer specifications

1) OPTICAL SYSTEM : Rowland off-circle arrangement Single monochromator Double beam type. double beam type.

- a) Light Source : D2 Lamp & Halogen lamp
- b) Wavelength Range : 190-1100nm
- c) Wavelength Accuracy : ± 0.2 nm (at 656.1 nm) or better
- d) Wavelength Repeatability : ± 0.1 nm or better
- e) Spectral Bandwidth : 1nm
- f) Stray light :
 - i. 1 % (198 nm KCL 12 g/L aqueous solution)
 - ii. 0.02 % (220 nm NaI 10 g/L aqueous solution)
 - iii. 0.02 % (340 nm NaNO₂ 50 g/L aqueous solution)
 - iv. 0.02 % (370 nm NaNO₂ 50 g/L aqueous solution)
 - v. SBW: 1 nm
- g) Photometric Range : -3~3 Abs
- h) Photometric Accuracy :
 - i. ± 0.0016 Abs (0 to 0.5 Abs)
 - ii. ± 0.0026 Abs (0.5 to 1 Abs)
 - iii. ± 0.3 %T
 - iv. Tested with NIST SRM 930D
- i) Photometric Repeatability :
 - i. ± 0.0007 Abs (0 to 0.5 Abs)
 - ii. ± 0.0007 Abs (0.5 to 1 Abs)
 - iii. Tested with NIST SRM 930D
- j) Scanning speed : Variable up to 8000 nm/min
- k) Slew speed : 24,000 nm/min
- l) RMS Noise : 0.00005 Abs
- m) Baseline stability : 0.0005 Abs/hour
- n) Baseline flatness : ± 0.0006 Abs (200 - 1000 nm)
- o) Detector : Silicon photodiode



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- p) Power requirements : 220 V
q) Quantity : 4 Nos.
r) Warranty : One Year

2) Measurement modes, Quantitative Analysis

Wavelength scan (Abs, %T, %R, Sample, Reference), Time scan (Abs, %T, %R, Sample, Reference), Fixed wavelength (Up to 8 wavelengths), Abs/%T monitor

3) Data processing:

Peak picking, Peak height, Peak area, Peak width, Derivatives, Smoothing, Data truncation, Arithmetic, Baseline correction, Subtraction, Deconvolution, Vertical axis conversion, Horizontal axis conversion

4) Other standard functions:

Validation Software, Enzyme activity calculation Report format S/W, Film thickness measurement, Color analysis, Daily maintenance, Two wavelengths time course measurement

5) Future Compatibility : Peltier Temp Controller -10 to 110degC