INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

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Technical Specification of Multimode Microplate Reader

Advanced high-performance Multimode microplate reader for measurement of Fluorescence Intensity, FRET and UV-Vis absorbance and should be onsite upgradable to other detection modes.

General Specifications:

1. Following Detection Modes & features should be included:
    1. Fluorescence Intensity & FRET
    2. UV/Vis Absorbance
    3. Low volume (2ul) DNA/RNA measurements using additional adapter
    4. 1x Built-in reagent injectors for time critical assays

2. Should be possible to upgrade for following modes, at site:
    1. Luminescence (flash & glow)
    2. TRF & TR-FRET
    3. Fluorescence Polarization
    4. Atmospheric Gas Control Unit for O2/Co2 for cell based assays

3. Measurement Modes: Top and Bottom reading
    1. Endpoint and Kinetic measurements
    2. Spectral Scanning in all modes
    3. Well Scanning with upto 900 data points per well

4. Microplate Formats 6- to 384 well plates & low volume (2ul) plate /adapter
5. Shaking Linear, orbital, and double-orbital with user-definable time and speed
6. Incubation +4°C above ambient to 60°C
7. Read Times 10 sec for 96 well plate & 20 sec for 384 well plate
8. Focal Height Adjustment Automated focal height adjustment for optimal position of detector
9. Reagent Injector Module Should include one reagent injector and upgradable to add one more later
    1. Injection volumes for each well: 3 to 500 µL
    2. Adjustable injection speed up to 400 µL/s

10. Fluorescence Intensity, FRET Measurement Mode:

Light Source High energy xenon flash lamp
Detector Photomultiplier Tube (PMT)
Wavelength Selection LVF Monochromator / Quad Monochromator based & also bandpass filters for high sensitivity assays.

1. True Hybrid technology allowing to choose either Monochromators and/or Filters vice versa in any combination for excitation & emission wavelength selection

Wavelength range 320 – 740 nm (for Monochromator) & 240 – 740nm for filters

Dichroic Mirror Auto-tuning / user selectable Spectral Range: 340 - 740 nm
Bandwidth User selectable in the range 8 – 100nm
Spectral Scanning Fluorescence Excitation / Emission Spectral Scanning with resolution of 0.1nm
Optical Filters
1. The filter block should hold atleast 4 excitation filters and 4 emission filters
2. TRF, TR-FRET, FP should be by dye specific filters.

Sensitivity plate
1. Using Filters : Top: < 0.5 pM & Bottom: < 1.0 pM fluorescein, 384 well plate
2. Using Monochromators : Top: < 1 pM & Bottom: < 4.0 pM fluorescein, 384 well plate

Gain Auto gain / Auto focus for each well
Dynamic range 8 logs linearity

11. Absorbance Measurement Mode :
Wavelength range 220 – 999 nm
Wavelength Selection Spectrometer based
Detector CCD Array / Photodiode
Accuracy: < 1% at 2 OD
Dynamic Range: 0 - 4 OD
Scan Speed Capture a full UV / Vis absorbance spectrum (220 to 1000 nm) in less than 2 second per well

12. Software: License free Multi-user software package including Reader Control and Data Analysis Software
    1. Data Statistics, User defined Formulas, Signal Curve Analysis, Standard Curve with various fit types
    2. PARALLEL LINE ANALYSIS, comparative studies (One-way Anova/Unpaired t-test/Paired t-test) should be
    3. possible. The software should be US FDA 21 CFR Part 11 compliant
13. Consumable: 100 quantity of 96-well black plates for fluorescence measurement should be included

14. Device Control / interface: Should be supplied with desktop i5 Processor (10^{th} gen), 8GB RAM, 1TB SSD drive, 18" Monitor, Keyboard, Mouse, Windows 10 /11 OS, 1 KVA UPS with atleast 20 min back up

15. Advanced data analysis system: PC with AMD RYZEN 9 5900X CPU + CPU cooler,12GB dedicated graphics card,16GB RAM,1TBSSD,4TB HDD,27" Monitor,keyboard,mouse,Windows 10/11 OS

16. Warranty: One year