

### Technical Specifications for Multimode Microplate Reader

- The device should be a multimode spectrum scanning microplate reader with photometry, fluorometric intensity (top and bottom, monochromator based), luminescence, and the ability to upgrade to hTRF AlphaScreen and AlphaLISA
- The system's specifications should all be validated and guaranteed. There should be no typical or relative values in the specification.
- Instead of using the software's default settings, the Auto Gain feature should be offered. In order to produce a single, reliable measurement range, the instrument should automatically calibrate results with various gain settings.
- Auto-calibration and self-diagnosis options are available when the instrument is first turned on as well as throughout longer kinetic assays.
- Instrument should have automatic dynamic range selection to adjust the photomultiplier tube sensitivity based on the signal strength of the sample well. Adjustment to be done individually for every well and every measurement.
- It is necessary to emphasize the fluorescence and luminescence's dynamic range, which should be more than six to seven decades.
- For flash luminescence experiments such as Ca<sup>2+</sup> flow, ATP assays, etc., the cited apparatus should feature a single dispenser.
- There should be an incubator and a shaker on board. Incubation temperature should be upto 45°C and orbital shaker with adjustable speed and diameter.
- The system must come with analysis software with an unlimited user licence.
- Any number of measurement steps (multiple detection modes) should be possible within a single software programme.
- Orbital Shaking with adjustable timing, speed and diameter. Automatic safety control based on the shaking speed and plate format to avoid spilling of the liquid from wells.
- No loss of previously recorded data, even in the event of a power outage.
- Should work with accessory plates and 32 low volume samples with volumes as low as 2 ul.
- Autonomous Smart Safety Checks such as Plate, Prime, Position Sensor, Shaker, and Dispensing Volume Checks.
- Automatic plate check mode and priming vessel check mode should be available on the instrument to avoid unintentional reagent dispensing inside the instrument.
- The ability to incorporate numerous plates into a measurement session and combine the data from each plate into a single data set.
- In order to help avoid unintentional leaking of the liquid out of the wells, the instrument should be able to control combinations of shaking speed and diameter.
- A minimum one-year warranty should be included with the Multimode Microplate Reader.

### Optical System:

- Instrument should have Quadruple Monochromator based, double excitation and double emission monochromators for fluorescence applications.
- Instrument should have double monochromators for photometric (UV and Vis) measurement.
- The instrument should have a single lamp source and separate detectors for Photometry, Fluorometry and optional module for Time resolved fluorescence and Luminescence.

### Absorbance / Photometry

- Measurement range in Photometry: 200-1000 nm
- Read out range 0 - 6 Abs.
- Light source: Xenon flash lamp
- Linear measurement range: 0 – 4 Abs (96-well plate) at 450 nm, ± 2%, 0 – 3 Abs (384-well plate) at 450 nm, ± 2%
- Accuracy: 0.003 Abs or ± 2%, at 200 – 399 nm (0 – 2 Abs), 0.003 Abs or ± 1%, at 400 – 1000 nm (0 – 3 Abs)
- Precision SD < 0.001 Abs or CV < 0.5%, at 450 nm (0 – 3 Abs)

## Fluorescence/Fluorometry:

- Fluorometry wavelength selection: Excitation range: 200-1000nm, Emission: 270-840nm.
- Excitation bandwidth: 5 nm and Emission bandwidth: 12 nm.
- Wavelength selection Double excitation and emission monochromators
- Wavelength accuracy should have Excitation  $\pm 2$  nm, emission  $\pm 3$  nm
- Fluorescence intensity sensitivity of <0.4 fmol fluorescein per well with 384 well black plates.
- Monochromators based top & bottom reading with top reading speed >6 decades & bottom reading of >5.5 decades.
- Plate Type: 6 well to 1536 well format

## Luminometry:

- Wavelength range should be from 360 - 670 nm.
- Plate reading format 6 well to 1536 well plate (spectral scanning 6 - 384 well plates).
- Luminometric sensitivity of <7 amol ATP/well with 384 well white plate using flash ATP reaction. Should have spectral scanning option.
- Luminometry should have three measurements mode – Normal, Filter and Monochromator mode with excellent sensitivity.
- Wavelength selection: Filter wheel with no filter and up to 8 optional filter positions
- Filter size Diameter: 25.0 (+0,-0.3) mm and Thickness: 3.5 – 7.0 mm
- Dynamic range should be 7 decades, Crosstalk: < 1%, white 384-well plate
- Measurement time: 10 – 10 000 ms

## Data Analysis Software:

- Database based software to run backups of all data, restore back up data (in case of hardware failure of original computer).
- Software should be provided with unlimited user license for multiple users for flexibility.
- Software should have option for area selection. i.e. different protocols at different area of the same plate.
- Software should have ability for Blank Subtraction, calculate Average, SD, CV%, normalization of data, pathlength correction, dose response and offer different kinetic measurements.
- Spectral scanning of all 96 samples or 384 samples should be able to view in single graph plot.
- Single software program should allow any number of measurement steps / different detection method within the same program.
- System should be fast with measurement Speed: Reads a 96-well plate in 15 sec., a 384-well plate in 45 sec., and a 1536-well plate in 135 sec. (minimum times).