

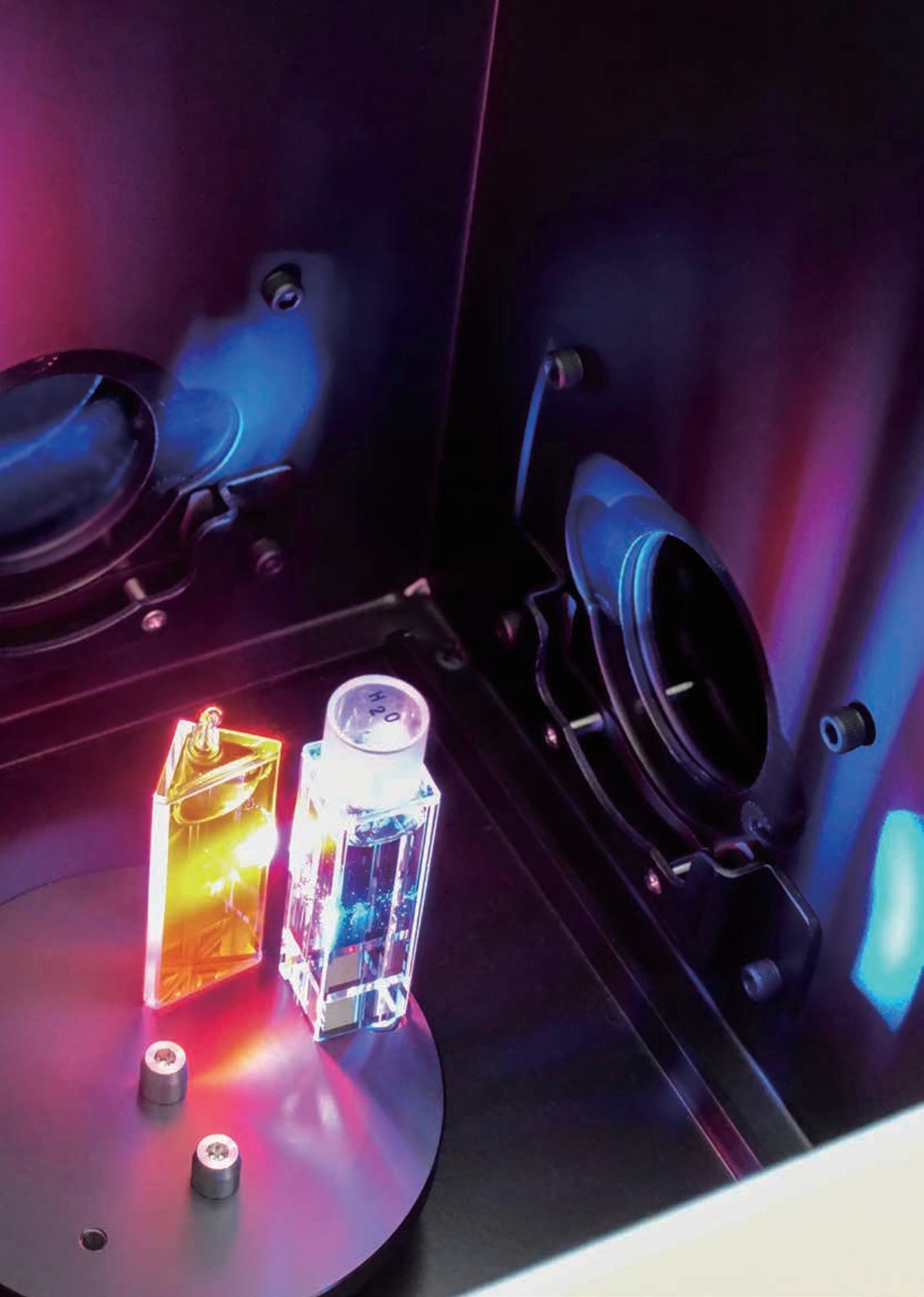
# Spectrofluorometer

FP-8050 Series



**JASCO**

Performance  
Innovation  
Reliability



In 1967, JASCO launched the FP-1, which was the first in a long line of spectrofluorometers. The FP-8050 Series is the latest range of instruments developed to provide accurate measurements for bio- and material sciences, from a simple entry level model for fluorescence spectral measurements and sensitive quantitation to the advanced models developed for demanding research applications including spectral correction and quantum yields.

The FP-8050 Series includes the powerful cross-platform Spectra Manager™ suite of software.

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## Table of Contents

|                                     |    |
|-------------------------------------|----|
| <b>Instrument and Systems</b>       |    |
| Features                            | 4  |
| Performance                         | 8  |
| <b>Accessories and Applications</b> | 10 |
| <b>Software</b>                     |    |
| Spectra Manager™                    | 20 |
| Standard Measurement Programs       | 22 |
| Optional Software                   | 24 |
| Validation and Accessory Kits       | 26 |
| <b>Specifications</b>               | 27 |

# FP-8050 Series

The FP-8050 Series of spectrofluorometers includes four different instruments that provide solutions for the broadest range of applications including QC, biomolecular structural studies, environmental monitoring and advanced materials science. The FP-8050 Series has many flexible options for academic or industrial research, teaching, or use in quality control labs. Users can have the greatest confidence in their measurements, with an optical bench specifically designed for the highest sensitivity, widest dynamic range, and exceptional spectral purity with automatic cut-off filters to exclude higher order diffraction.

The FP-8050 Series combines a compact design with the largest range of accessories together with Spectra Manager™ Suite, a comprehensive data platform that gives you complete control over measurement, analysis and data archiving. In addition to the standard analysis programs, JASCO has developed many different applications software for dedicated sample measurement.



## FP-8250

Simple and sensitive system which readily accommodates routine measurements and accessories, such as spectral scanning, quantitation, and temperature control.



## FP-8350

Workhorse model offering the powerful combination of affordable performance, sensitivity and flexibility for most biological, environmental, and materials applications.



## FP-8550

Sophisticated optical system offering the ultimate in sensitivity, spectral accuracy, and flexibility for the most challenging materials and biological samples.



## FP-8650

Uniquely optimized for NIR applications with extended wavelength measurement to 1010 nm.

## Advanced Features of the FP-8050 Series

- High-throughput optical system
- Highest S/N performance
- Wide dynamic range (up to 7 orders of magnitude)
- Auto Gain and Auto Sensitivity Control System
- Automatic cut-off filters for higher-order diffraction
- Advanced digital signal processing
- High-speed scanning
- Spectral bandwidth down to 1 nm
- Spectral Correction

## Extensive Breadth of Features and Accessories

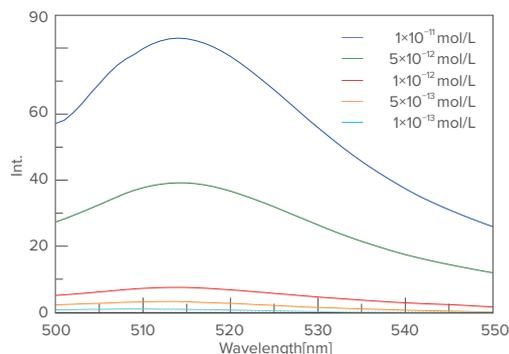
- Compact benchtop footprint
- Precision temperature control accessories for liquids and solids
- Polarizers allow for automatic anisotropy measurements
- Integrating spheres for Quantum Yield Determination
- Microplate Reader for rapid sample throughput
- Microsampling accessories for small volume samples
- Stopped-flow systems for monitoring fast kinetics
- Spectra Manager™ software for control and data analysis
- Flexible design for expanding capabilities as needs evolve

## Versatility for a Wide Range of Applications

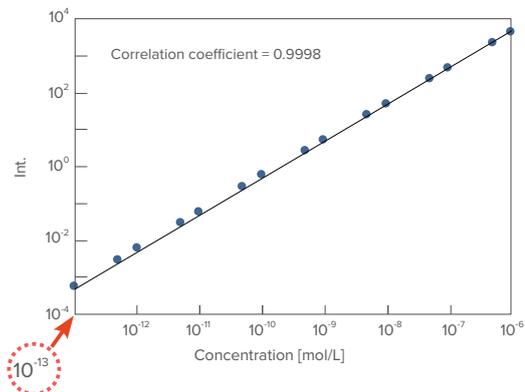
- Protein dynamics
- Quantitative analysis
- Cellular membrane studies
- Enzyme kinetics
- Water quality monitoring
- Quantum dot and probe design
- Carbon nanostructures and 2D materials
- Fluorescent tracking materials
- Short lifetime phosphorescence and PHOLEDs

## Outstanding sensitivity and linear dynamic range

The high-throughput optical system and low noise signal processing of the FP-8050 Series results in a high signal-to-noise (S/N) performance up to 8,500:1\* (RMS). In addition, the dynamic range of FP-8050 Series has been developed to provide up to 7 orders of magnitude. As shown in the calibration curve for fluorescein, there is excellent linearity even for samples at very low concentrations.



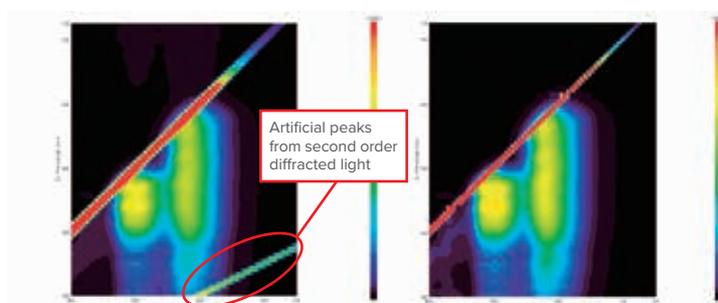
Fluorescein spectra for a range of concentrations



Calibration curve for fluorescein (Auto Sensitivity Control System (SCS) ON)

## Higher-order light cut-off filters

In order to remove peaks originating from higher-order diffracted light, cut-off filters appropriate to the measurement wavelength should be used. The models FP-8350, FP-8550, and FP-8650 include cut-off filters that are switched automatically as the wavelength range is set by the user.



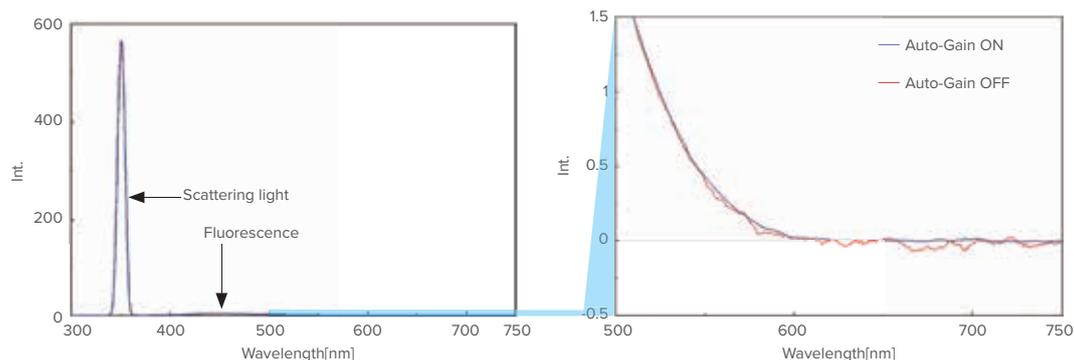
Without Cut-Off Filter      With Cut-Off Filter  
3D Spectra of Fluorescent Orange Color Plate

## Accurate spectral correction

Spectral correction should be made to any fluorometer for the measurement of accurate and reliable spectral data. All models in the FP-8050 Series can be spectrally corrected using a simplified procedure. JASCO has a range of calibration standards for spectral correction, including standard light sources and Rhodamine B. These can be found on page 26.

## Auto-adjustment of detector gain and sensitivity

The FP-8050 Series includes both Auto-Gain and Auto Sensitivity Control System (SCS), which automatically adjust the detector gain and sensitivity for optimum measurement. Auto-Gain automatically adjusts the gain of the signal from the detector so that the S/N is optimized throughout the entire scan range for spectral measurement, and weak fluorescence peak shapes can be observed against scattered light with a high S/N. The Auto-SCS allows the user to create calibration curves for a wide concentration range without having to manually change the instrument sensitivity settings.



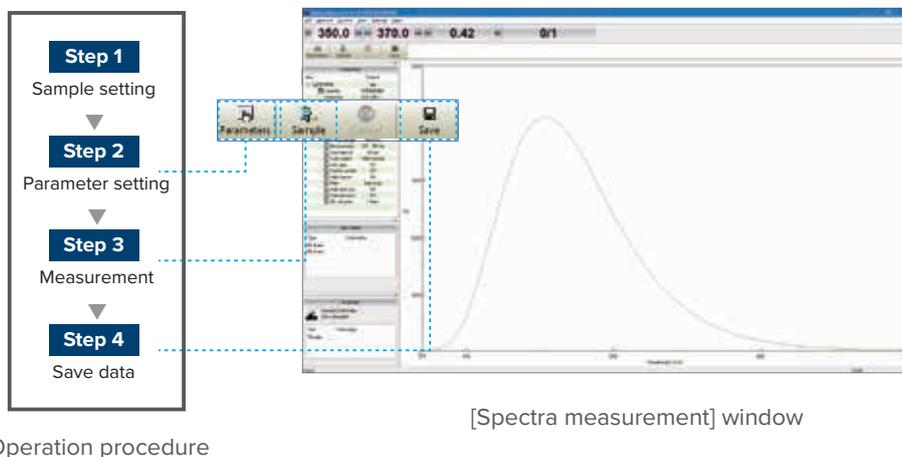
Fluorescence spectra of quinine sulfate solution

\*Typical S/N for FP-8500 for water Raman, using on peak baseline noise.

# Convenience for routine operation

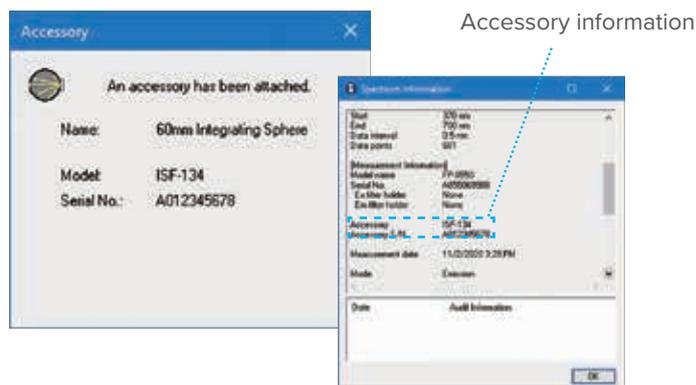
## Tool buttons

A simple sequence of buttons guides the user through routine operation from measurement to saving data.



## Automatic Accessory Recognition

Accessories are automatically recognized when installed in the instrument. Spectra Manager™ logs the accessory name and serial number; this information is saved in the data file for a complete record of the measurement.



## Enhanced Measurement Functions

### Saturation log (photometric value)



If the photometric value exceeds a set limit during measurement, it is recorded in the log file.

### Simple parameters



In basic mode, the user can make measurements with minimal parameter settings for fast set-up and analysis.

### Fluorescence Maxima search



Automatically finds the appropriate excitation and emission wavelengths.

### Self-motion auto-zero



Ensures that the user performs an "auto-zero" prior to sample measurement for accurate data.

### Automated shutter function (open/close)



Limits the exposure of the sample to light during measurement.

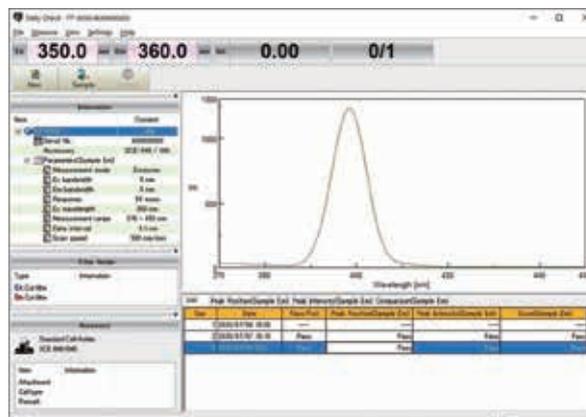
## Daily monitoring of instrument performance

### Validation program

The Validation program includes a full suite of tests to validate instrument performance. When executed, simple prompts guide the user on how to perform the tests. All instruments in the FP-8050 Series include a mercury lamp as standard for wavelength calibration.

### Daily Check program

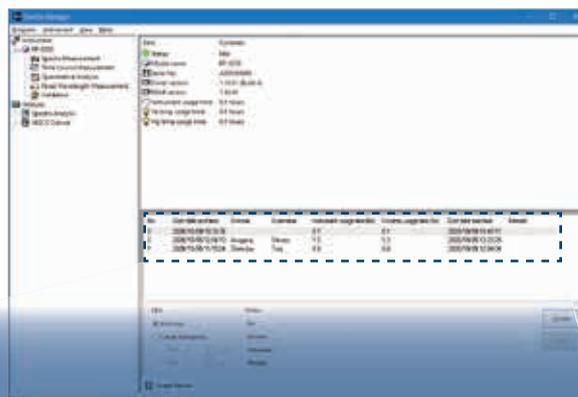
The Daily Check is a simple alternative to the Validation program; a less comprehensive performance check can be made at any time for continuous performance monitoring. After starting the Daily Check program, a timer is activated, and sample measurement is executed automatically after a predetermined stabilization time. The batch display lets the user check the cumulative data over a period of time.



Daily Check program

## Instrument activity log

The instrument activity log is a useful alternative to the paper log books found in multi-user facilities. A record is maintained of user, duration of operation and lamp usage.



| No. | Start date and time | Division  | Username | Instrument usage time (hr) | Xe lamp usage time (hr) | End date and time   | Remark |
|-----|---------------------|-----------|----------|----------------------------|-------------------------|---------------------|--------|
| 3   | 2020/10/09 10:33:36 |           |          | 0.1                        | 0.1                     | 2020/10/09 10:40:17 |        |
| 2   | 2020/10/05 12:04:13 | Inorganic | Steven   | 1.3                        | 1.3                     | 2020/10/05 13:22:29 |        |
| 1   | 2020/10/05 11:15:04 | Chem bio  | Tina     | 0.8                        | 0.8                     | 2020/10/05 12:04:04 |        |

Instrument usage record

## Long-life light source

Continuous output xenon arc lamps offer the greatest sensitivity. For the longest and highest performance, the FP-8050 Series now includes a newly designed Xe arc lamp with prolonged lifetime. This new light source can be used up to 3x longer than previous lamps (maximum operating time: approximately 3000 hours), with long-term stable measurements, reduced maintenance and lower running costs.

# Instrument Overview

## FP-8250

**A simple, robust solution for routine fluorescence measurements such as spectral scanning, temperature dependent measurement, and quantitation.**

The FP-8250 is a user-friendly, general-purpose instrument that allows for measurement with a quick press of a start button on top of the instrument. The simplified, yet sensitive design includes everything that is required for routine fluorescence measurements in a quality-control or teaching lab. The standard Auto-Sensitivity Control System (Auto-SCS) and Auto-Gain features enable measurement over a wide range of concentrations using a single calibration method. The Spectra Manager™ Suite of spectroscopy software offers full system control, with easy-to-use tools for data processing and analysis.



- High sensitivity S/N > 4,500 (RMS, water Raman)
- High-speed scanning up to 20,000 nm/min
- Wavelength range: 200 to 750 nm

## FP-8350

**A workhorse system and the best choice for sensitivity and flexibility, providing solutions for a diverse range of applications with an unparalleled range of accessories.**

The FP-8350 is a user friendly spectrofluorometer with a wide range of accessories that are well suited to biological research. The standard automatic cut-off filters eliminate artifact peaks due to second-order scatter, giving users confidence in their spectra data. Single and multi-cell Peltier accessories provide exceptional temperature control for thermal studies such as molecular conformation and folding. Automated broad wavelength polarizers can be used for a range of experiments including anisotropy for further insight into binding events. Rapid-kinetics and titration measurements can be automated with fully integrated stopped-flow and auto-titrator units. Solid samples can be measured with dedicated holders for powders, films, etc.



- High sensitivity S/N > 8,000 (RMS, water Raman)
- High resolution of 1.0 nm
- Wavelength range: 200 to 750 nm (900 nm optional)

# FP-8550

**Sophisticated optical system – ultimate performance with the highest sensitivity and spectral accuracy.**

The FP-8550 is a powerfully sensitive spectrofluorometer with the broadest range of accessories, whatever the application: biological, environmental, materials science, teaching labs, and core facilities. It includes an optimized optical design for very low stray-light and enhanced spectral purity. Combined with the most thorough spectral correction, material engineers and researchers are assured of accurate measurements for the evaluation of advanced materials. The FP-8550 performs with the highest sensitivity\* for fast measurement of samples with low level fluorescence, whether they are challenging biochemical systems or low quantum efficiency materials. The Auto-Gain and Auto-SCS functions optimize the S/N for samples with large differences in signal intensity and concentration offering a dynamic range up to 7 orders of magnitude. High-speed scanning of phosphorescent samples and 3D spectra enables fast acquisition of high-quality, high-density data.



- \*High sensitivity S/N > 8,500 (RMS, water Raman)
- High-speed scanning up to 60,000 nm/min
- Wavelength range: 200 to 850 nm
- Validation accessory included as standard

# FP-8650

**For UV-visible to NIR applications.**

The FP-8650 spectrofluorometer uses a uniquely red-sensitive PMT that extends the measurement range from the UV-Visible to the near infrared. Providing excitation wavelengths from 200 to 850 nm and emission detection up to 1010 nm, samples such as carbon nanotubes, porphyrins and other NIR markers can easily be measured. It is especially well-suited for monitoring NIR-labeled biologicals far away from background auto-fluorescence. The compact instrument design incorporates high-speed scanning and automatic cut-off filters to exclude higher-order diffraction for fast, accurate acquisition of single spectra and EEMs (Excitation-Emission-Matrices).



- High sensitivity S/N > 8,500 (RMS, water Raman, standard detector)
- High-speed scanning up to 120,000 nm/min Emission
- Wavelength range (Excitation): 200 to 850 nm
- Wavelength range (Emission): 200 to 980 nm (1010 nm optional)
- Validation accessory included as standard

# Temperature Control

## Single-Position Peltier Cell Holders

**EHC-113 | Peltier-thermo Cell Holder (air)** ●●

**ETC-115 | Peltier-thermo Cell Holder (water)** ●●



**EHC-113**



**ETC-115**

### Specifications

| Model                        | EHC-113   | ETC-115                               |
|------------------------------|---|---------------------------------------|
| Compatible Cells             | Micro cell: 3 × 3 or 5 × 5 mm, Rectangular cell: 10 × 10 mm, 1 pc   |                                       |
| Temperature Control System   | Heating/cooling system utilizing Peltier effect   |                                       |
| Peltier Heat Radiation       | Air cooled  | Water cooled                          |
| Stirring System              | Integrated variable speed magnetic stirrer  |                                       |
| Temperature Setting Range    | 5 to 70 °C  | -10 to 110 °C                         |
| Temperature Control Range    | 10 to 60 °C (at 25 °C)  | 0 to 100 °C (20 °C water temperature) |
| Temperature Control Accuracy | ±0.1 °C   |                                       |
| Temperature Accuracy         | With cell holder sensor: ±0.5 °C (20 to 40 °C), ±1 °C (< 20 °C and > 40 °C)<br>With in-cell sensor: ±0.2 °C |                                       |
| Standard Accessory           | In-cell sensor  |                                       |

## Multi-Position Peltier Cell Changer

**PCT-118 | Peltier-thermo 4-position Automatic Cell Changer (water)** ●●



**PCT-118**

### Specifications

|                              |   |
|------------------------------|---|
| Compatible Cells             | Micro cell: 3 × 3 or 5 × 5 mm, Rectangular cell: 10 × 10 mm, 4 pcs  |
| Temperature Control System   | Heating/cooling system utilizing Peltier effect   |
| Peltier Heat Radiation       | Water cooled  |
| Stirring System              | Integrated variable speed magnetic stirrer  |
| Temperature Setting Range    | -10 to 110 °C   |
| Temperature Control Range    | 0 to 90 °C (20 °C water temperature)  |
| Temperature Control Accuracy | ±0.1 °C   |
| Temperature Accuracy         | With cell holder sensor: ±0.5 °C (20 to 40 °C), ±1 °C (< 20 °C and > 40 °C)<br>With in-cell sensor: ±0.2 °C |
| Standard Accessory           | In-cell sensor, 1 piece   |
| Optional Accessory           | In-cell sensor, 3 pieces set (factory option)   |

used with all FP-8050 Series **All Models**

used with FP-8250 **FP-8250**

used with FP-8350 **FP-8350**

used with FP-8550 **FP-8550**

used with FP-8650 **FP-8650**

purge is standard **Purge**

## Constant Temperature Cell Holders/Changers

### CTH-107 | Water-thermo Cell Block ●

### STR-112 | Water-thermo Cell Holder with Stirrer ●

#### Specifications

| Model Name            | CTH-107   | STR-112                                    |
|-----------------------|---|--|
| Compatible Cells      | Micro cell: 3 × 3 or 5 × 5 mm, Rectangular cell: 10 × 10 mm, 1 pc |  |
| Temperature Control   | Thermostatted water circulation                                   |  |
| Stirring System       | -   | Integrated variable speed magnetic stirrer |
| Operating Temperature | 5 to 90 °C  |  |



**STR-112**

### FCT-117 | Water-thermo 8-position Automatic Turret Cell Changer ●

### FCT-117S | Water-thermo 8-position Automatic Turret Cell Changer with Stirrer ●

#### Specifications

| Model Name            | FCT-117  | FCT-117S                                   |
|-----------------------|--|--|
| Compatible Cells      | Micro cell: 3 × 3 or 5 × 5 mm, Rectangular cell: 10 × 10 mm, 8 pcs |  |
| Temperature Control   | Thermostatted water circulation                                    |  |
| Stirring System       | -  | Integrated variable speed magnetic stirrer |
| Operating Temperature | 5 to 90 °C   |  |



**FCT-117**

### CSP-129 | Sample Compartment Lid with Pipette Port ●

Allows the addition of a reagent to the sample cell without opening and closing the sample compartment lid. It is recommended for use with cell holders that include an integrated stirrer, such as the STR-112, EHC-113 or ETC-115 cell holders.

Compatible syringe needle: 2 inches (50 mm)

*\*3 mm microcell cannot be used.*

## Other Temperature Control Accessories

### CTU-100 | Mini Water Circulation Bath ●

#### Specifications

|                             |   |
|-----------------------------|---|
| Dimensions                  | 170 (W) x 200 (H) x 311 (D) mm                                  |
| Temperature Control Range   | 10 °C below ambient temperature to 40 °C (IN and OUT connected) |
| Temperature Sensor Accuracy | ±0.2 °C (at 20 °C)  |
| Bath Capacity               | 100 mL  |
| Cooling/Heating Capacity    | 57 W  |



**CTU-100**

# Sample Holders

## Ambient Temperature Cell Holders

### FUV-803 | Absorbance Measurement Cell Block

Specifications

|                  |   |
|------------------|---|
| Wavelength Range | 220 to 900 nm; depending on configuration |
|------------------|---|



FUV-803

### FHM-804 | High Sensitivity Measurement Cell Block

The FHM-804 includes a reflection mirror used to improve light collection efficiency to increase the sensitivity of the fluorescence measurement.



FHM-804

### FSA-805 | 30-Degree Incident Angle Cell Block for Triangle Cell

### FSA-806 | 30-Degree Incident Angle Cell Block for Rectangular Cell

Specifications

| Model                    | FHM-804  | FUV-803                      | FSA-805         | FSA-806                      |
|--------------------------|--|------------------------------|-----------------|------------------------------|
| Compatible Cells         | Micro cell: 3 × 3 or 5 × 5 mm, Rectangular cell: 10 × 10 mm              | Rectangular cell: 10 × 10 mm | Triangular cell | Rectangular cell: 10 × 10 mm |
| Diffusion Plate Material |  | Spectralon                   |                 |                              |
| Sensitivity              | Max. 3x higher than standard cell holder (0.05 Abs. or less, 10 mm cell) |                              |                 |                              |



FSA-805

## Solid Sample Holders

The FDA-808 is used for solid and powder samples, the FLH-809 is used for films and solid samples, and the FPA-810 is dedicated to powder sample measurements and can also be used for micro powder samples.

### FDA-808 | Solid Sample Holding Block

### FLH-809 | Film Holding Block

### FPA-810 | Powder Sample Cell Block



FP-1061 Powder Sample Cell



FDA-808



FLH-809



FPA-810

Specifications

| Model          | FDA-808          | FLH-809                                 | FPA-810                        |
|----------------|------------------|---|--------------------------------|
| Incident Angle | 30 degrees       |   |                                |
| Solid Sample   | Min sample size  | 25 (H) × 25 (W) mm                      | 12 (H) × 12 (W) mm             |
|                | Max sample size  | 50 (H) × 50 (W) mm                      | 50 (H) × 50 (W) mm             |
|                | Sample thickness | 10 mm or less                           | 18 mm or less                  |
| Powder Sample  | Standard cell    | FP-1061 Powder sample cell              | PSH-101 Powder sample cell     |
|                | Cell holder size | φ 20.5 mm, thickness 1 mm (with spacer) | φ 12 mm, thickness 0.5 to 4 mm |

### PSH-002/102/103 | Optional Cells for FPA-810

Specifications

| Model      | PSH-002     | PSH-102 | PSH-103 |
|------------|-------------|---------|---------|
| Cell Size: | φ 16 mm     | φ 8 mm  | φ 5 mm  |
| Thickness: | 0.5 to 4 mm |         |         |



PSH-002



PSH-102



PSH-103

### 250BP30 | Optional Bandpass Filter

This bandpass filter can be mounted to the holder located on the excitation side of the solid sample block. The center wavelength is 250 nm, half bandwidth is 30 nm, with a 5 mm thickness and 25 mm cell size.

# Microsampling

- used with all FP-8050 Series All Models
- used with FP-8250 FP-8250
- used with FP-8350 FP-8350
- used with FP-8550 FP-8550
- used with FP-8650 FP-8650
- purge is standard Purge

## Micro cell Jackets and Micro cells

When sampling very small volumes, two microsampling accessories are available. The micro cell jacket and micro cell (FMH-857 and J/3-3.45/Q/3\*) is a 3 × 3 mm cell designed for sample volumes as small as 50 µL. The FMH-802 and J/3-5.45/Q/5\* is a 5 × 5 mm quartz cell with 400 µL volume with a stir bar and 500 µL without.

**FMH-857 | 3 mm Micro Cell Jacket for J/3-3.45/Q/3\*** ●  
**3 mm Micro Quartz Cell**

**FMH-802 | 5 mm Micro Cell Jacket for J/3-5.45/Q/5\*** ●  
**5 mm Micro Quartz Cell**



*FMH-857  
with  
J/3-3.45/Q/3\**



*FMH-802  
with  
J/3-5.45/Q/5\**

## One-Drop Accessory

The SAF-151 One-Drop Measurement Unit for the FP-8050 Series to measure micro-volume samples of protein and nucleic acids. The minimum sample volume is 5 µL for the 1 mm pathlength cell and measurement only takes 15 seconds.

**SAF-151 | One-Drop Measurement Unit** ●



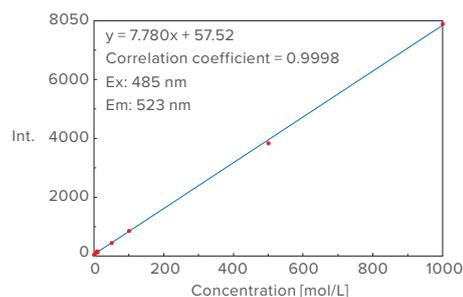
**SAF-151**

## One-Drop Fluorescence Measurement

SAF-151 One-Drop Measurement Unit offers quantitative analysis or simple spectrum measurements requiring a minimum sample volume of 5 µL. Without using a rectangular cell, easy and accurate measurements can be obtained with only one drop of sample from a pipette.



One-Drop Measurement System



Calibration Curve of  
λ DNA labeled with PicoGreen

\*Manufactured by Starna.

# Integrating Spheres and Phosphorescence

Phosphorescence data can be obtained using a variety of measurement programs such as Spectra Measurement, Quantitative Calibration and Analysis, Fixed Wavelength Measurement, Time Course Measurement, and Phosphorescence Lifetime Measurement.

**ISF-134 | 60 mm dia. Integrating Sphere** ● ●

Used for quantum efficiency measurements and color evaluation measurements of opaque solid or powder samples.

**ILF-135 | 120 mm dia. Integrating Sphere** ● ●

Used for quantum efficiency measurements of liquids or thin membrane samples on a transparent substrate as well as opaque solid or powder samples.



**ISF-134**

**ILFC-147 | LN<sub>2</sub> Cooled 120 mm dia. Integrating Sphere** ● ● ●

Used for quantum efficiency measurement of samples cooled with liquid nitrogen. It can also be used at ambient temperatures without liquid nitrogen.

**Specifications**

| Model Name                               | ISF-134   | ILF-135  | ILFC-147   |
|--|---|--|--|
| Inner Diameter                           | 60 mm   | 120 mm   | 120 mm   |
| Minimum Sample Size                      | 20 (H) x 20 (W) x 0.5 (T) mm                                | 20 (H) x 10 (W) x 0.5 (T) mm   | 20 (H) x 10 (W) x 0.5 (T) mm   |
| Maximum Sample Size                      | 60 (H) x 50 (W) x 25 (T) mm                                 | 30 (H) x 20 (W) x 6 (T) mm   | 30 (H) x 20 (W) x 6 (T) mm   |
| Cells                                    | PSH-004 (standard),<br>PSH-002, PSH-003, PSH-005 (optional) | 1, 2 mm liquid cell, 3 mm powder cell,<br>10 mm rectangular cell,<br>KBr plate sample holder | 1, 2 mm liquid cell, 3 mm powder cell,<br>10 mm rectangular cell,<br>KBr plate sample holder,<br>LPH-140, PPH-150, CPH-160 |
| Optional Spectral Correction Accessories | ESC-142, ESC-143  |  |  |

**PMU-130 | Liquid Nitrogen Cooling Unit** ● ● ● ●

Used to measure samples cooled with liquid nitrogen.

**Specifications**

|                     |                           |
|---------------------|---------------------------|
| Cooling Temperature | 77 K (-196 °C)            |
| Optional Cells      | LPH-140, PPH-150, CPH-160 |



**PMU-130**

- used with all FP-8050 Series [All Models](#)
- used with FP-8250 [FP-8250](#)
- used with FP-8350 [FP-8350](#)
- used with FP-8550 [FP-8550](#)
- used with FP-8650 [FP-8650](#)
- purge is standard [Purge](#)

### Cells for ISF-134



*PSH-002*

- PSH-004 | Powder Sample Cell (Cell Size:  $\phi$  12 mm, Thickness: 0.5 to 4 mm)**
- PSH-003 | Small Quantity Powder Sample Cell (Cell Size:  $\phi$  5 mm, Thickness: 0.5 to 4 mm)**
- PSH-002 | Powder Sample Cell (Cell Size:  $\phi$  16 mm, Thickness: 0.5 to 4 mm)**
- PSH-005 | Powder Sample Cell (Cell Size:  $\phi$  8 mm, Thickness: 0.5 to 4 mm)**

### Cells for IILF-135/ILFC-147



#### 1 mm liquid cell

Path length: 1 mm  
Path width: 10 mm  
Sample volume: 200  $\mu$ L



#### 2 mm liquid cell

Path length: 2 mm  
Path width: 10 mm  
Sample volume: 400  $\mu$ L



#### 3 mm powder cell

Cell size: 19 (H) x 10 (W) x 3 (T) mm



#### 10 mm Rectangular Cell Holder

Used to mount a 10 x 10 mm rectangular cell inside the ILF-135/ILFC-147 integrating spheres.



#### KBr Plate Sample Holder

Used to sandwich a powder sample between two KBr plates (5 x 5 x 1 mm).

### Cells for ILFC-147/PMU-130



#### LPH-140 | Phosphorescence Measurement Cell Kit for Liquid Sample

Tube Size: 5 mm O.D. x 178 mm  
Tubing Material: Synthetic quartz



#### PPH-150 | Phosphorescence Measurement Cell Kit for Powder Sample

Cell Size:  $\phi$  7 mm x 0.5 or 1 mm



#### CPH-160 | Phosphorescence Measurement Cell Kit for Solid Sample

Min. Sample Size: 5 (H) x 5 (W) x 1 (T) mm  
Max. Sample Size: 18 (H) x 10 (W) x 3 (T) mm

# Fluorescence Polarization Anisotropy

Fluorescence anisotropy occurs when a fluorophore emits different intensities of light dependent on the polarization angle of the incident light. Fluorescence anisotropy can be used to probe the structural flexibility of a fluorophore, which cannot be obtained by fluorescence spectroscopy alone.

## Polarizer/Filter Accessories

**FDP-837 | Automatic Polarizer** ●●●

Wavelength range: 220 to 700 nm



**FSP-838 | Depolarization Plate** ●

Wavelength range: 200 to 900 nm



**FDP-223 / FDP-243 | Polarizer and Analyzer Accessory** ●

FDP-223 (for UV-Vis)

- Wavelength range: 220 to 700 nm

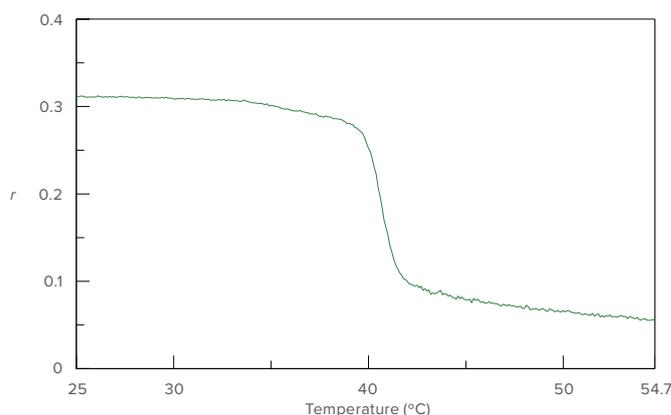
FDP-243 (for Visible)

- Wavelength range: 400 to 700 nm



## Example of Anisotropy Measurement

A fluorescent dye (DPH) was added to a lipid bilayer and the degree of polarization was measured as a function of temperature, as well as the fluorescence intensity and anisotropy. The data obtained can be used to elucidate binding properties and phase transitions induced through vesicle interactions and the heat of temperature changes.



Fluorescence anisotropy at each temperature (DPH interacting with liposome)

**All Models** used with all FP-8050 Series

**FP-8250** used with FP-8250

**FP-8350** used with FP-8350

**FP-8550** used with FP-8550

**FP-8650** used with FP-8650

**Purge** purge is standard

### OBF-132 | Optical Fiber Unit ●●

Used to measure a sample located outside the sample compartment using optical fiber probe.



OBF-132

### EFA-133 | Epi-Fluorescence Unit ●●

Used to irradiate a sample facing downward on the top of the accessory and to measure the samples epifluorescence. The minimum incident beam size is 1 x 1.5 mm with a 45° incident angle.



EFA-133

### HPC-136 | High Temperature Powder Cell Unit ●●

An internal heater provides temperature control for measuring the effects of temperature variation on the sample fluorescence intensity.

#### Specifications

|                       |   |
|-----------------------|---|
| Temp Control System   | Heating system  |
| Heat Radiation System | Water-cooled  |
| Temp Control Range    | Room temperature + 25 to 300 °C (cooled water temperature at 25 °C) |
| Temp Stability        | ±1 °C   |
| Standard Cell         | Powder cell A, φ 20 mm x 1 mm Powder cell B, φ 20 mm x 0.5 mm       |



HPC-136

### CSH-131 | Cryostat Holder ●●●

Used with either the Optistat DN or DN-V by Oxford instruments.



CSH-131

# Autosampling

## Autosampling Systems

The autosampler system obtains automated measurement by combining an autosampler, syringe pump or sipper, and flow cell unit. Up to 192 liquid samples can be measured on all FP-8050 models, however, there are various rack options that can be used with either test tubes and/or vials. The system allows for automated scanning measurements at predetermined parameters using a flow cell. The PC control Spectra Manager™ software is included as standard.



### ASU-800 | Autosampler Unit

Optional sample racks (must be specified)

| Rack                                    | Compatible Test Tube and Vial       | Max. Number of Samples |
|---|-------------------------------------|------------------------|
| SRA-811 15 mm O.D. Test Tube            | 15 mm (O.D.) × 105 mm (H), 10 mL    | 100                    |
| SRA-812 13 mm O.D. Test Tube            | 13 mm (O.D.) × 100 mm (H), 7 mL     | 100                    |
| SRA-813 12 mm O.D. Test Tube            | 12 mm (O.D.) × 105 mm (H), 5 mL     | 150                    |
| ISRA-814 10 mm O.D. Test Tube           | 10 mm (O.D.) × 90 mm (H), 3 mL      | 150                    |
| SRA-818 Vial                            | Screw top vial, 2 mL                | 120                    |
| SRA-816 Microplate                      | 96-well microplate, 250 µL          | 192                    |
| SRA-817 Constant Temperature Microplate | 96-well amplification plate, 250 µL | 192                    |



ASP-849

### ASP-849 | Syringe Pump

Can be used in conjunction with ASU-800 and FSC-124 flow cell holder. The ASP-849 can be used with syringe volumes of 1.0, 2.5, 5.0, and 10.0 mL and has a reproducible volume delivery within ±1 %.



AWU-828

### SHP-120 | Peristaltic Sipper

### QFS-122 | Vacuum Sipper

#### Specifications

| Model                  | SHP-120            | QFS-122     |
|------------------------|--------------------|-------------|
| Cell Material          | Synthetic quartz   |             |
| Tubing Material        | PharMedTeflon, SUS | Teflon, SUS |
| Carryover              | Less than 2 %      |             |
| Min Sample Requirement | 700 µL             |             |

### AWU-828 | Washing Unit

Optional washing unit for use with QFS-122 and SHP-120.



FSC-124

## Flow Cell Holders

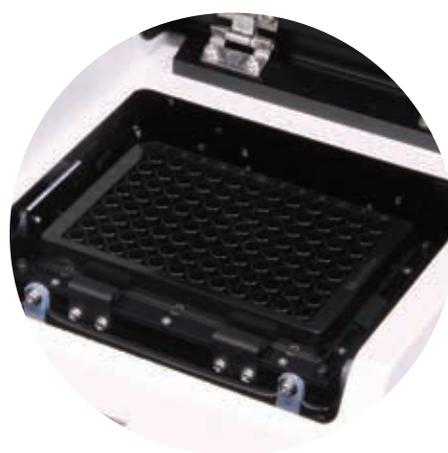
### FSC-124 | Flow Cell Holder

Minimum sample requirement volume is 700 µL.

# Microplate Reader

## Microplate Reader

The FMP-125 Microplate reader can be used with the FP-8350, FP-8550 and FP-8650. Four standard measurements are available including Spectra Measurement, Quantitative Analysis, Time Course, and Fixed Wavelength. Quantitative Analysis can be used to create a calibration curve, as well as measure unknown samples in a single microplate while the Time Course Measurement software can be used to measure parallel kinetics for multiple samples.



### FMP-125 | Microplate Reader ● ● ●

#### Specifications

|                             |  |
|-----------------------------|--|
| Compatible Plate            | 96-well and 384-well black microplate for fluorescence (SBS standard), 1 pc. |
| Measurement Time            | 1 min./plate (96-wells, fixed wavelength measurement, specified condition)   |
| Min Sample Requirement      | 80 µL/well (96-well microplate)  |
| Photometric Reproducibility | ±3 %   |
| Optional Accessories        | Constant temperature microplate holder                                       |
| Temperature Control System  | Heating system (Option)  |
| Temperature Control Range   | Room temperature +10 to 50 °C (Option)                                       |

**All Models** used with all FP-8050 Series

**FP-8250** used with FP-8250

**FP-8350** used with FP-8350

**FP-8550** used with FP-8550

**FP-8650** used with FP-8650

**Purge** purge is standard

# Spectra Manager™ Software Suite

## Instrument Control

Drivers are included to control each spectroscopy instrument and parameter dialogs allow easy editing of pre-saved parameter files. Data acquired from each instrument is automatically loaded into the analysis program to free up the PC and control software to acquire more data during post-acquisition processing. Each instrument driver also has its own dedicated application for instrument hardware diagnostics and validation.

## Flexible Display Features

User-friendly features include overlay printing in colors and patterns, autoscale mode, and style and font, as well as customized toolbars.

## Data Processing and Spectral Analysis

View and process several types of measurement data files (UV/Vis/NIR, FTIR, Raman, Fluorescence, CD) in a single window, using a full range of data processing functions. Features include arithmetic operations, derivatives, peak detection and processing, smoothing, and baseline correction.

## Report Publishing

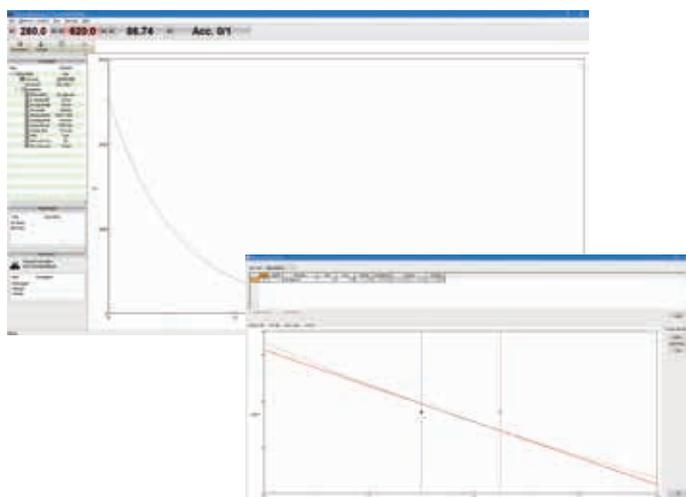
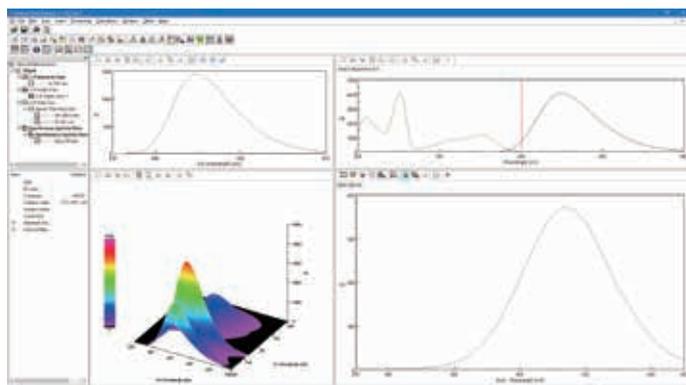
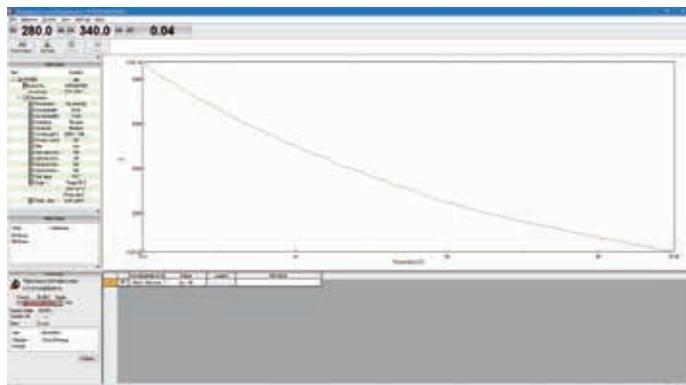
JASCO Canvas allows users to create layout templates of spectral data and results to meet individual reporting requirements.

## Macro Command Option

This software can be used to develop user-designed application programs for individual experimental set-up and routine measurements, including instrument control, data acquisition, post-acquisition data processing and reporting.

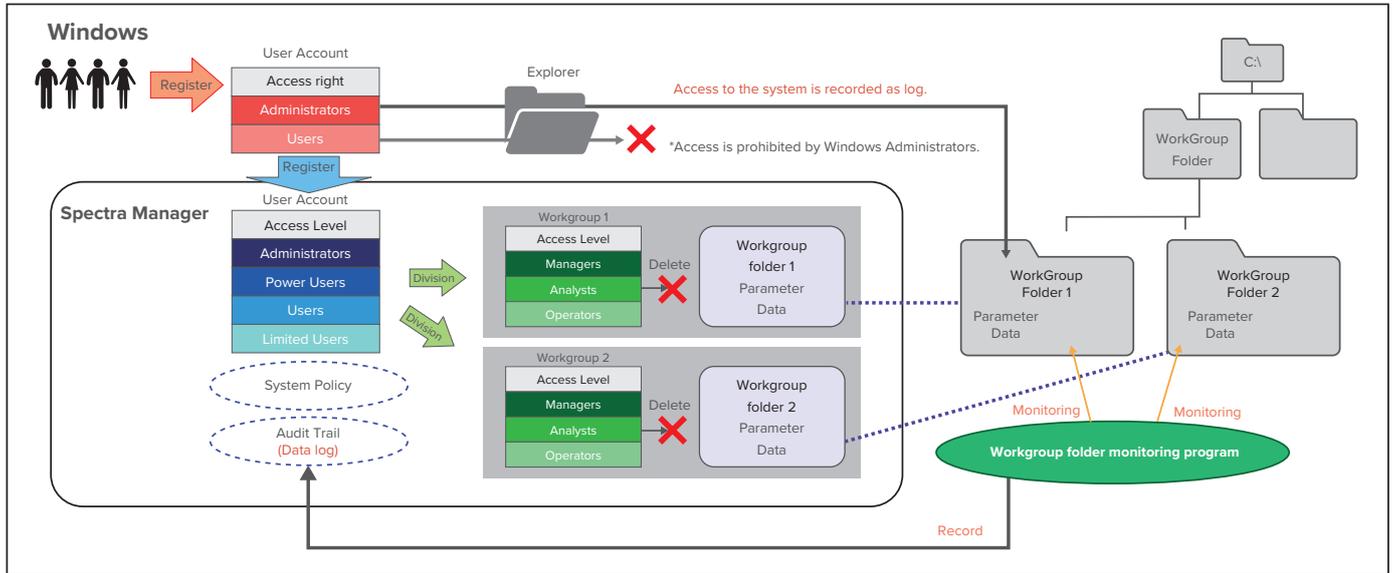
## Secure Access with Spectra Manager™ CFR

Spectra Manager CFR provides secure access and compliance with 21 CFR Part 11. System access requires a username and password, which are assigned by the Workgroup Manager. Individual levels determine the access to administrative tools that include instrument and analysis application installation, user and workgroup setup, security policies, as well as system and application history logs. Three levels of electronic signatures are required, including creation, review, and approval stages. An audit trail is assigned to every data file, recording any spectral data processing.



# Regulatory Compliance with Spectra Manager CFR™

JASCO Spectra Manager is designed and developed under ALCOA+ and is a total solution platform to create accurate and complete data.



## Data Integrity

### User Management

Based on the dual security category ([Access Level] and [Work Group]), it is possible to manage different authorization process in flexible and independent as total analysis systems, instrumentations and analytical applications.

### Enduring Electronic Record

Based on prohibiting function to delete electronic record and to overwrite save, and also functions for backup and restore data, electronic records can be saved properly and can be searched accurately during the data lifecycle.

### Audit Trail

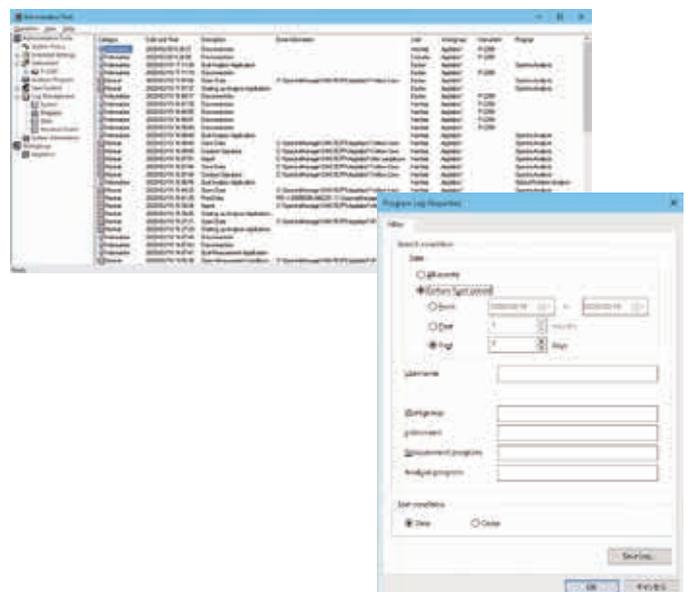
It is categorized as 3 different records (system log, application log and data log), and it is recorded. Each log can be filtered and displayed under recorded date, user name etc, and it can be exported for audit trail review.

### Computerized System Validation

Spectra Manager CFR is developed and manufactured properly under quality control system adapted ISO 9001, and adapted CSV standard.

### User Account Security

Based on functions to prevent duplicate account or to protect password, and to prevent unauthorized access, administrative authorizations as system access and electric signature etc., can be managed strictly.

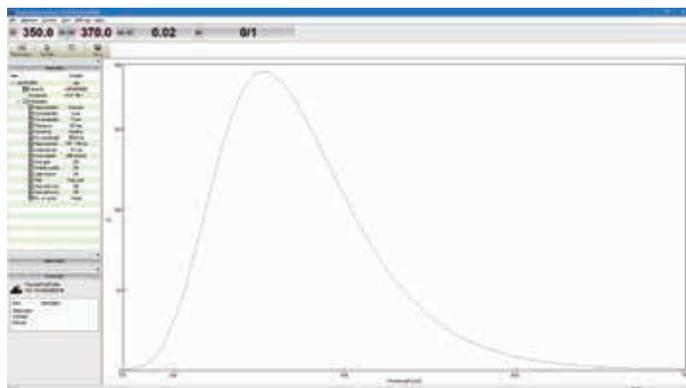


# Standard Measurement Programs

## Spectra Measurement

The FP-8050 Series spectrofluorometer can measure five different types of spectra: emission, excitation, synchronous, single-beam emission and single-beam excitation in both fluorescence and phosphorescence\* modes.

\*Excludes FP-8250.

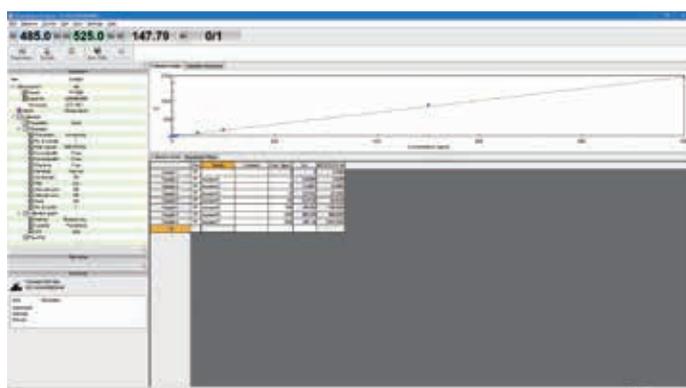


## Time Course Measurement

The Time Course Measurement program is used for measuring temporal changes of fluorescence intensity at a fixed wavelength. Up to 100,000 hours (FP-8350/8550/8650) and 1,667 hours (FP-8250) of continuous measurements can be performed using a 60 minute and 60 second interval, respectively.

## Quantitative Analysis

In the Quantitative Analysis software, optimal parameters from two photometric modes, emission and excitation, and three quantitation methods, no base (1 wavelength), one-point base (2 wavelengths) and two-point base (3 wavelengths) can be selected depending on the application. Other quantitative calibration curve methods such as log or spline functions are also available.



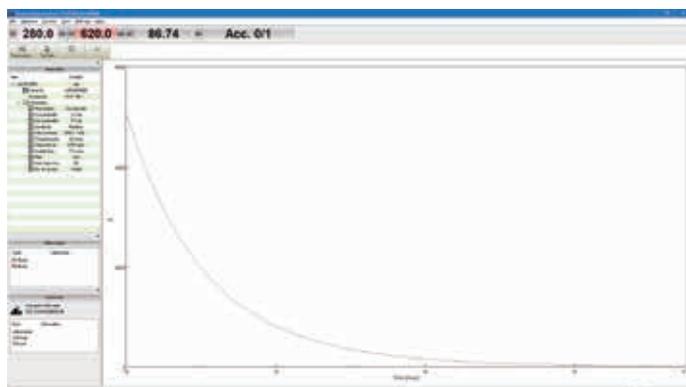
## Phosphorescence Lifetime Measurement

Measures changes in the phosphorescence of a sample briefly irradiated by the excitation source.

\*Excludes FP-8250.

## Interval Scan Measurement

Measures up to three spectra (fluorescence, excitation, and synchronous) and displays the results as either 2D or 3D spectra, as well as contour or color-coded plots.



## Fixed Wavelength Measurement

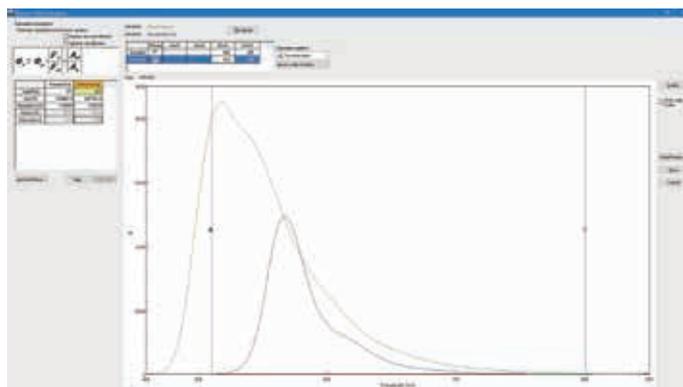
This program can be used to measure a sample's fluorescence or phosphorescence intensity at fixed excitation and emission wavelengths for up to four wavelengths.

## Relative Quantum Yield

All models in the FP-8050 Series include a relative quantum yield calculation program as standard.

## Absorbance Spectra Measurement

Obtain the transmittance, absorbance, or reflectance spectrum by measuring the synchronous spectrum of a sample. The optional FUV-803 Absorbance measurement cell block is required for absorbance and transmittance measurements while reflectance measurements require an integrating sphere.

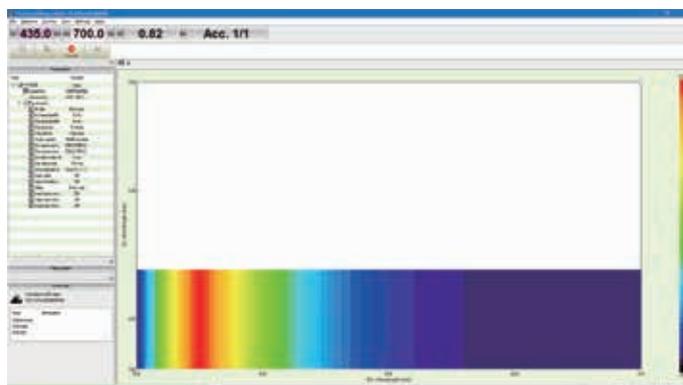


## 3D Measurements

Allows for the simultaneous display of several different sets of data, including 2D, 3D, and synchronous spectra. The 3D plots can be viewed in Contour, Color 3D, and Color-mapping.

## Spectral Correction

Allows users to easily compare measured spectral data from several instruments as well as determine the quantum yield efficiency. Corrected spectra can be obtained immediately after the measurement is completed. The FP-8250/8350 require optional jigs for spectral correction. A Rhodamine B ethylene glycol solution is also included as a standard and additional sources for correction can be obtained separately.



## Validation

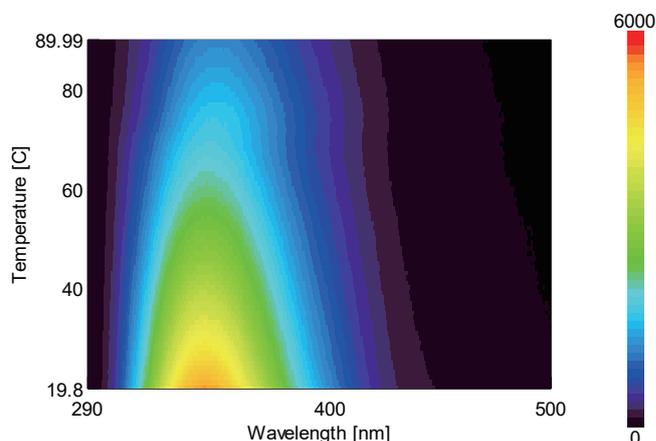
The validation program includes instrument test procedures in compliance with JIS (K 0120 2005) and JAIMAS (0004-2005). This program provides six performance tests including wavelength accuracy, wavelength repeatability, resolution, stray light, sensitivity, and photometric stability. The test results and procedures can be saved and/or printed.

# Optional Software

Measurement Programs - From Data Acquisition to Data Processing and Analysis

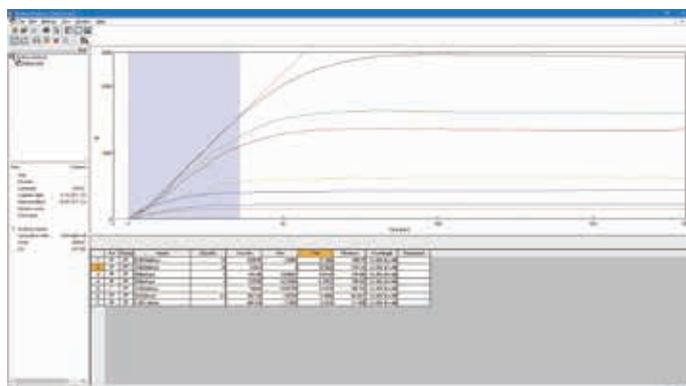
## FWTP-174 | Temperature Control Measurement

This program can be used to evaluate the melting temperatures of biological samples. The melting temperature,  $T_m$ , is calculated from the results of a time course measurement during a temperature change. The ETC-115 single position or PCT-118 Water-cooled Peltier thermostatted 4-position cell holders are required for use.



## FWTS-172 | Temperature Interval Scan Measurement

This program is used to acquire excitation and emission spectra at a defined temperature interval with a temperature controlled accessory such as the ETC-115 single position or PCT-118 Water-cooled Peltier thermostatted 4-position cell holders.



## VWKN-772 | Advanced Kinetics Analysis

This program obtains a time course kinetic measurement and plots the data in various graphs, as well as calculates the maximum reaction velocity ( $V_{max}$ ), Michaelis-Menten constant ( $K_m$ ), and Hill constant ( $n$ ). It can be used with automated cell holders.

## FWAP-175 | Fluorescence Polarization Measurement

The total fluorescence intensity (F), fluorescence anisotropy (r), and degree of polarization (P) can be measured using the FDP-837 automatic polarizer unit, providing auto-depolarization fixed wavelength measurements or auto-depolarization time course measurements.

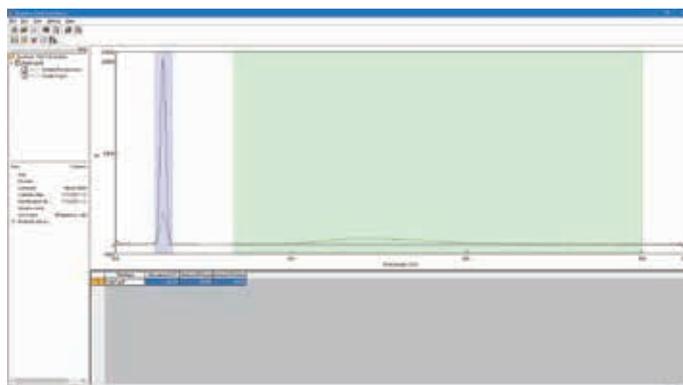
## FWQE-880 | Quantum Yield Calculation

Calculates the quantum yield of a sample with the use of an integrating sphere as well as the ESC-142 calibrated light source (WI)

*\*Excludes the FP-8250/8350.*

## FWTC-173 | Dual-Wavelength Time Course Measurement

Enables time course measurements of the ratio of fluorescence intensities at two different wavelengths for either the excitation or emission. The calcium concentration calculation function in the program can also calculate the change in concentration of an intracellular ion.



## FWFC-178 | Fluorescent Object Color Measurement

Enables evaluation of fluorescent sample color (fluorescent objective color) using the ISF-134 60 mm diameter integrating sphere and ESC-142 calibrated light source (WI). This program calculates the fluorescent sample color using a desired light source when the spectra of the various light sources are pre-registered. Spectral measurements are required in the range wider than 300 - 780 nm for excitation and 380 - 780 nm for emission.

*\*Excludes the FP-8250/8350.*

## FWLU-179 | Luminous Color Measurement

Obtains the luminescence or emission spectra of light emitting samples using ESC-142 Calibrated light source (WI). Data analysis includes a colored chromaticity diagram and calculation of the correlated color temperature and color rendering index.

## FWMC-183 | Macro Command

Executes a sequence of pre-programmed operations automatically, including parameter setting, measurements, analysis and printing.

## Validation and Accessory Kits



### ESC-142 | JASCO Calibrated Light Source WI ●

The ESC-142 is used for spectral correction of the emission optical system from 300 to 1010 nm.



### ESC-143 | JASCO Calibrated Light Source D<sub>2</sub> ●

The ESC-143 is used for spectral correction of the emission optical system from 200 to 400 nm.



### SID-144 | JASCO Calibrated Detector ●

The SID-144 is used for spectral correction of the excitation optics from 200 to 900 nm.



### VDK-840 | Validation Kit ●

The VDK-840 is used for spectral correction of the excitation optics and for the stray light instrument validation test from 200 to 600 nm.



### WRE-362 | PM Tube ●

### WRE-165 | PM Tube ●

PM Tube for wavelength expansion.

*\*The expanded wavelength range is described in the specification sheet.*

**All Models** used with all FP-8050 Series

**FP-8250** used with FP-8250

**FP-8350** used with FP-8350

**FP-8550** used with FP-8550

**FP-8650** used with FP-8650

**Purge** purge is standard

# Specifications

| Model   | FP-8250  | FP-8350   | FP-8550   | FP-8650  |
|---|--|---|---|--|
| Light Source  | Xe lamp with shielded lamp house, 150 W (Long-life type)   |   |   |  |
| Light Source (for Validation)                             | Integrated, selectable low pressure mercury lamp   |   |   |  |
| Photometric System  | Ratio-photometer system using monochromatic light to monitor the intensity output of the Xe lamp |   |   |  |
| Monochromator   | Holographic concave grating in modified Rowland mount  |   |   |  |
| Wavelength Range (Standard)                               | Ex   | Zero order, 200 to 750 nm   | Zero order, 200 to 850 nm   | Zero order, 200 to 850 nm  |
|   | Em   |   |   | Zero order, 200 to 980 nm  |
| Wavelength Range (Optional)                               | Ex   | Zero order, 200 to 900 nm   | -   | -  |
|   | Em   |   |   | Zero order, 200 to 1010 nm   |
| Automatic Cut-Off Filter for High-Order Diffraction Light | -  | Standard  |   |  |
| Sensitivity (RMS)*  | 4,500:1  | 8,000:1   | 8,500:1   | 8,500:1 (Standard)<br>3,500:1 (Optional)   |
| Resolution  | Ex   | 1.0 nm (at 546.1 nm)  |   | 1.0 nm (at 546.1 nm)   |
|   | Em   |   |   | 2.0 nm (at 546.1 nm)   |
| Band Width  | Ex   | 1, 2.5, 5, 10, 20 nm  | 1, 2.5, 5, 10, 20, L5, L10 nm   | 1, 2.5, 5, 10, 20, L5, L10 nm  |
|   | Em   |   |   | 2, 5, 10, 20, 40, L10, L20 nm  |
| Wavelength Accuracy                                       | Ex   | ±1.5 nm   | ±1.0 nm (±0.3 nm at 546.1 nm)   | ±1.0 nm (±0.3 nm at 546.1 nm)  |
|   | Em   |   |   | ±2.0 nm (±0.3 nm at 546.1 nm)  |
| Wavelength Repeatability                                  | ±1.0 nm  |   | ±0.3 nm   |  |
| Wavelength Scan Speed                                     | Ex   | 20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000 nm/min | 10, 20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000, 60,000 nm/min   | 10, 20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000, 60,000 nm/min      |
|   | Em   |   |   | 20, 50, 100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000, 60,000, 120,000 nm/min |
| Slew Speed  | Ex   | 30,000 nm/min   | 60,000 nm/min   | 60,000 nm/min  |
|   | Em   |   |   | 120,000 nm/min   |
| Response  | 10, 20, 50, 100, 200, 500 msec, 1, 2, 4, 8 sec   |   |   |  |
| Detector  | Ex: Silicon photodiode, Em: PMT  |   |   |  |
| Photometric Range   | -10,000 to 10,000  |   |   |  |
| Sensitivity Selection                                     | High, Medium, Low, Very Low, Manual, Auto SCS  |   |   |  |
| Auto Gain   | Standard   |   |   |  |
| Shutter Function  | Standard (Automatic control)   |   |   |  |
| Sample Illuminating System                                | Horizontal illumination  |   |   |  |
| Sample Compartment  | 10 mm rectangular cell holder, nitrogen purgeable  |   |   |  |
| Recognition of IQ Accessory                               | Standard   |   |   |  |
| Start Button  | Standard   |   |   |  |
| Instrument Communication                                  | USB 2.0  |   |   |  |
| Control and Data Processing                               | Spectra Manager™ Ver.2.5/CFR   |   |   |  |
| Spectral Correction                                       | Option   |   | Standard<br>(Spectral correction using a Rhodamine B ethylene glycol solution is standard; other jigs for spectral correction are available separately as options.) |  |
| Dimensions  | 520 (W) x 545 (D) x 270 (H) mm   |   | 570 (W) x 545 (D) x 270 (H) mm  |  |
| Weight  | 36 kg  |   | 39 kg   |  |
| Power Requirement   | 290 VA   |   | 320 VA  |  |
| Installation Environment                                  | Temperature: 15 to 30 °C, Humidity: Less than 85%  |   |   |  |

\* Typical specification.



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