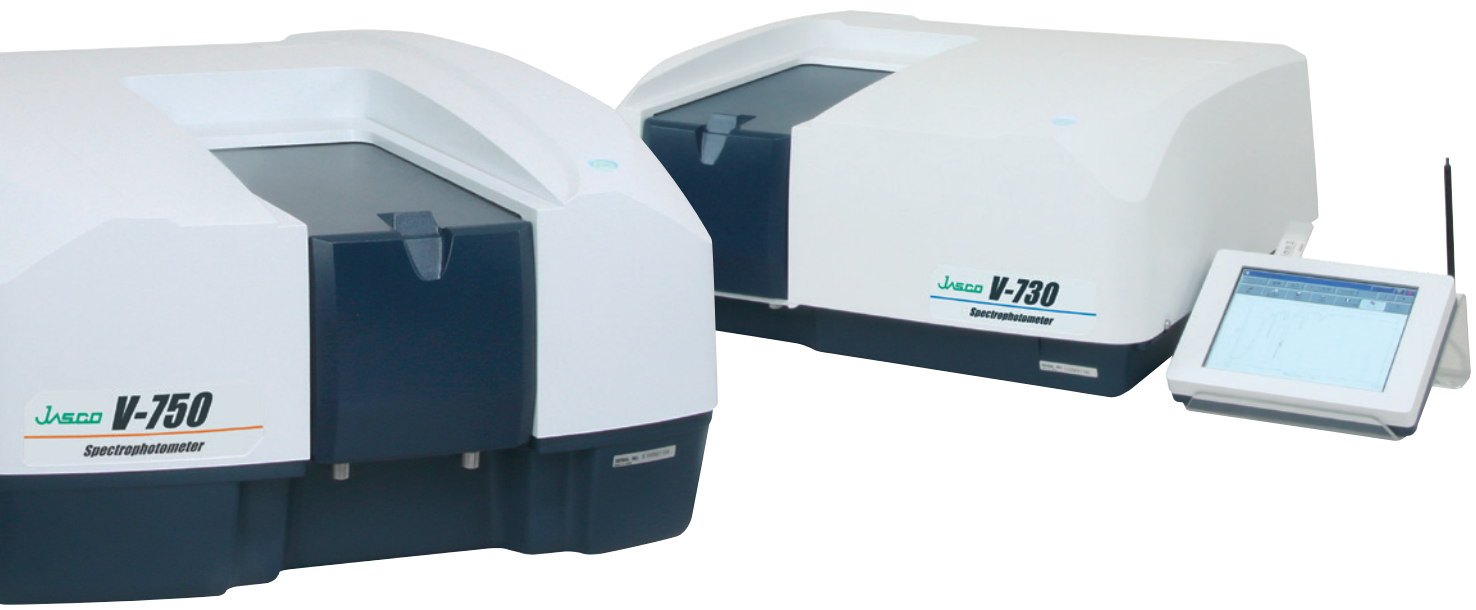
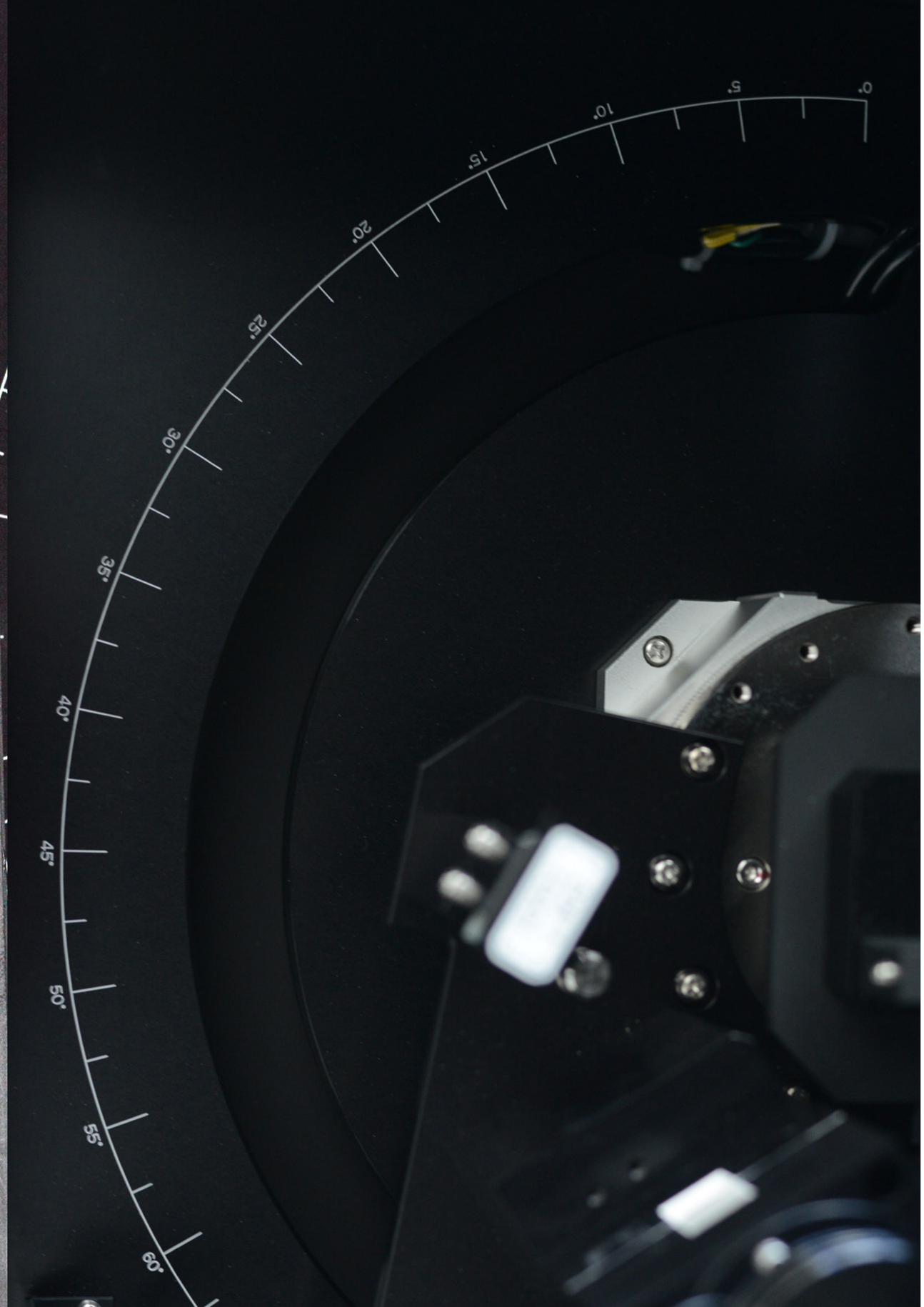
# UV-Visible/NIR Spectrophotometers

**V-700 Series**




JASCO

Performance
Innovation
Reliability




For scientists performing spectral characterization, thermodynamic studies, and quantitative measurements for advanced bio- and materials research, who need confidence in the accuracy and reproducibility of their measurements and rely on the results. The V-700 Series UV-Visible/NIR spectrophotometers provides an excellent optical system with wide wavelength range for a diverse array of applications.

The V-700 Series comprises five distinct models covering the entire spectrum from the far-UV (187nm) to the near-IR (3200nm). The compact optical design of the V-700 Series of UV-Visible spectrophotometers significantly reduces the requirement for bench space in the modern laboratory.

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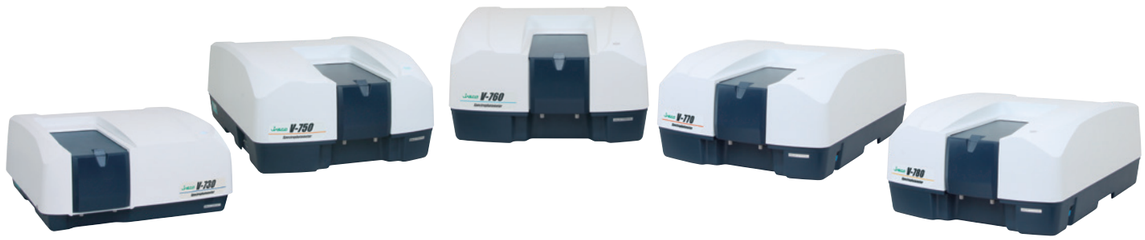
# Common Features of the V-700 Series



## Compact Design
The compact design of the V-700 Series of UV-visible spectrophotometers significantly reduces the requirement for bench space in the modern laboratory.

## Wide Wavelength Range
High energy throughput provides excellent signal-to-noise ratio for the entire UV-visible to NIR spectral range, with detectors selected for the highest sensitivity and dynamic range.

## Excellent Optical Performance
Sophisticated electronic and optical design reduces noise and stray light for highly accurate measurements over wide wavelength and photometric ranges.

## High Speed Scanning
High throughput optics and fast response detectors provide fast scanning without wavelength tracking errors.

## Dark Correction
Stray light reduction features that enable accurate measurement of strongly absorbing samples.

## Monochromator Step Scanning
Step scan provides reliable peak assignment to samples with narrow peak widths.

## User-Friendly Operation
Spectra Manager™ Suite for Windows and iRM hand-held controller for comprehensive control, acquisition and data processing. 21 CFR part 11 compliance is available for PC.

## Wide Range of Accessories and Applications software
A comprehensive selection of over 50 sampling accessories for gas, liquid and solid samples for many different applications, with matching dedicated application programs. IQ Accessory automatically recognizes the connected accessory and selects a matching measurement program.

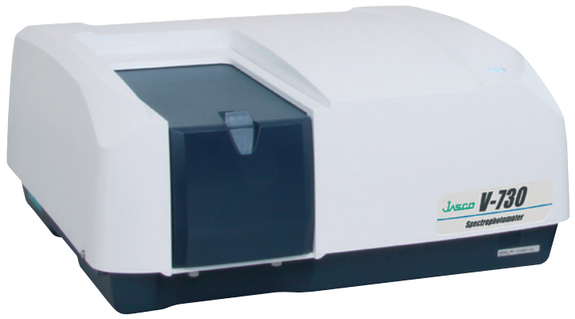
## IQ Start
For routine operation a measurement can be made from a simple push of the ‘Start Button’, great for routine operation or speeding up measurement for multiple users.

## Regulatory Compliance
All models can be used in GxP compliant laboratories, a comprehensive validation to USP, EP and JP is included as standard. Installation and Operational Qualification (IQ OQ) are available for installation and maintenance.



# V-730 UV-Visible Spectrophotometer

**The V-730 is a general-purpose double-beam spectrophotometer with a compact space-saving design. Its excellent spectroscopic performance is suitable for routine QC, teaching and research applications.**

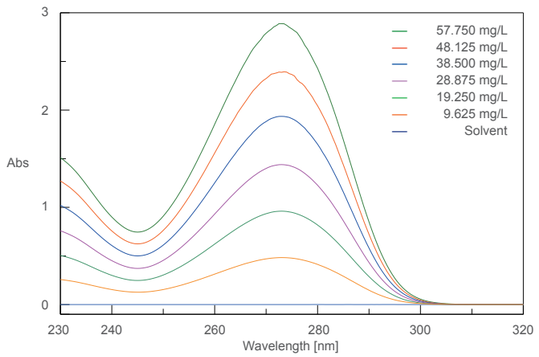



## System Features

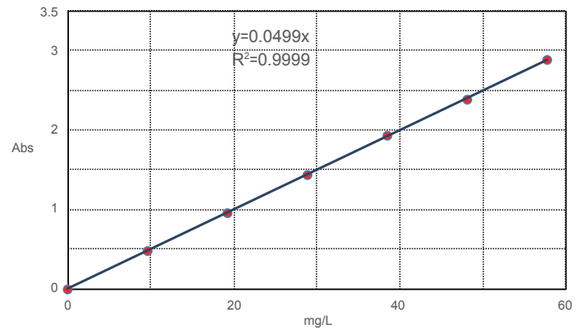
- Double-beam spectrophotometer with single monochromator and silicon photodiode detectors
- Compact with dimensions of only 440 (W) x 470 (D) x 215 (H) mm.
- Wide wavelength range – 190 to 1100 nm
- Fixed spectral bandwidth 1.0 nm for high resolution measurement
- High-speed scanning up to 8,000 nm/min
- Stray light 0.02% for exceptional absorbance linearity up to 3Abs

## Performance and Application

With an optimal balance between light intensity, signal to noise and resolution, with fast response and rapid monochromator slew speed, the V-730 can be used with a wide range of sampling accessories and optional programs for a broad range of analyses.




Spectra of Caffeine

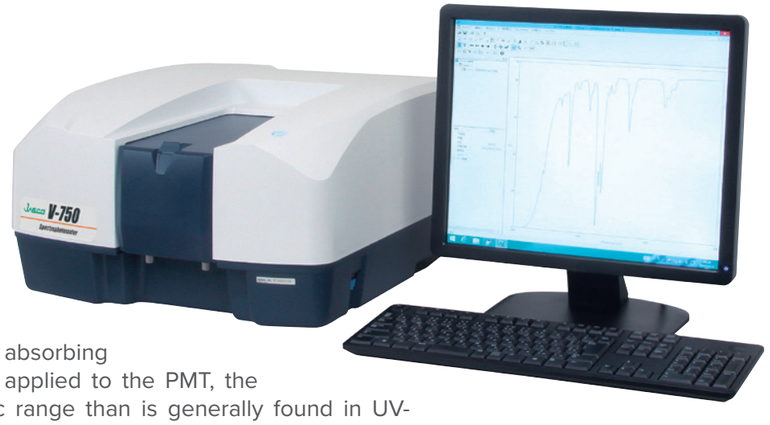



Calibration Curve of Caffeine

## V-730BIO for Life Sciences

The dedicated V-730BIO has been designed specifically for applications in Life Sciences. Comprising a V-730, with either Spectra Manager™ or an intelligent Remote Module (iRM) for biological and clinical analysis, and a micro cell holder. Bio-analytical application programs included are: protein/nucleic acid measurement, temperature ramping/DNA melting analysis, kinetics measurement with advanced analysis, and quantitative protein analysis with six different calibration methods.

# V-750 UV-Visible Spectrophotometer




## High resolution UV-Visible spectrophotometer with double-beam, single monochromator.

The V-750 UV-Vis spectrophotometer includes a precision double-beam optical system with variable spectral bandwidth. A high sensitivity PMT detector provides accurate and reproducible measurements for low to high absorbing samples. By controlling the high voltage applied to the PMT, the dynode feedback offers a wider dynamic range than is generally found in UV-Visible spectrophotometers. For high resolution measurements, such as gas and vapor phase spectroscopy, the spectral bandwidth can be set as narrow as 0.1 nm. Special low stray light slit settings which optimize the light image on the grating provide increased linearity to up to 4 absorbance units.

### System Features

- Double-beam spectrophotometer with single monochromator
- High sensitivity PMT detector
- Wide wavelength range – 190 to 900 nm
- Variable spectral band-width
- High-speed scanning up to 4,000 nm/min (Scanning speed on Preview mode is 8,000 nm/min)
- Stray light 0.005%

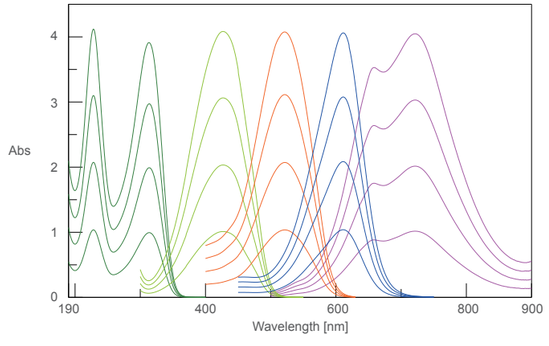
### Absorbance Linearity to Greater than 4 Abs Across a Wide Wavelength Range

The photometric linearity range is up to 4 Abs in the UV-Visible region (and up to 5 Abs in the visible region*). The V-750 offers measurement with a wide dynamic range and high-absorbance by employing optimized high-order cut-off filters, ultra high-resolution A/D converter and simplified signal processing prior to the A/D conversion

*Measurement of $KMnO_4$ solution.

### Performance and Application

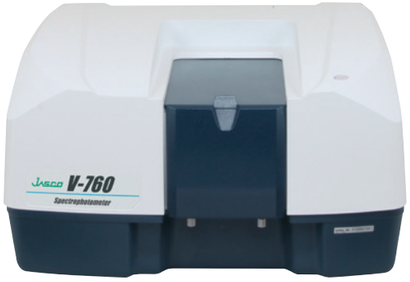
The V-750 can be used with most absorbance, transmittance or reflectance measurement in the UV-visible region, including liquids, solids and with options for specular absolute and diffuse reflectance.




Spectra of Various Solutions measured by V-750
(Green: Ranitidine hydrochloride, Yellow: Aluminium Lake, Orange: Amaranth, Blue: Indigocarmine, Pink: $NiSO_4$)



# V-760 UV-Visible Spectrophotometer




## High resolution UV-Visible double-beam spectrophotometer with double monochromator for Photometric Linearity to greater than 6 Abs.

The V-760 double beam, double monochromator optical design with lowest stray light (0.00008 %) offers high absorbance linearity across the entire photometric range. The V-760 can measure up to 6 Abs in the UV-Visible region (and up to 8 Abs in the visible region*). Variable spectral band width can be set down to 0.1 nm with special height slits to further reduce stray light and made even higher with rear beam attenuation.

*Measurement of $KMnO_4$ solution.

### System Features

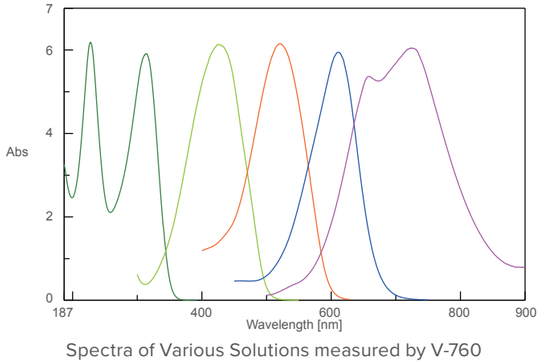
- Double-beam spectrophotometer with double monochromator
- High sensitivity PMT detector
- Wide wavelength range – 187 to 900 nm
- Variable spectral band-width
- Low stray light 0.00008 %
- High-speed scanning up to 4,000 nm/min (Scanning speed on Preview mode is 8,000 nm/min)

### Performance and Application

The V-760 is typically used where higher linear dynamic range is required for measurement of most absorbance, transmittance or reflectance in the UV-visible region, including liquids, solids and with options for specular absolute and diffuse reflectance.

### Step-Scan Measurement

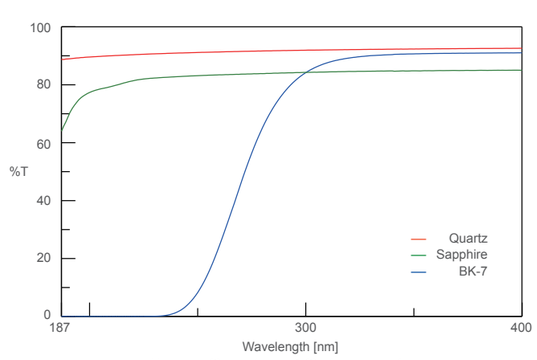
Step-scan is useful for accurate measurement of samples such as bandpass filters for which the transmittance changes significantly over a relatively narrow wavelength range.



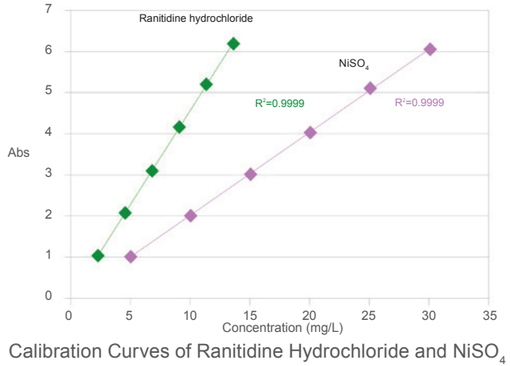

Spectra of Various Solutions measured by V-760
(Green: Ranitidine hydrochloride, Yellow: Aluminium Lake, Orange: Amaranth, Blue: Indigocarmine, Pink: $NiSO_4$)

### Measurement in the Far UV to 187 nm

The lower stray light optical design enables measurement in the UV down to 187 nm without $N_2$ purging. The transmittance spectra of three optical materials - quartz, sapphire and BK-7 measured using the FLH-741 film holder are shown below.

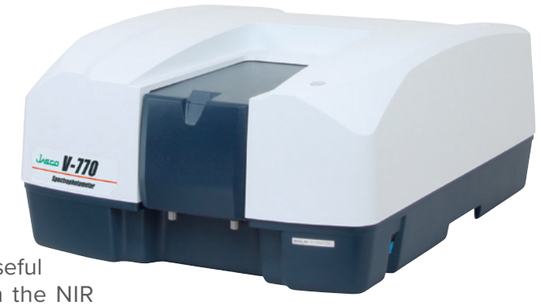



Transmittance Spectra of Optical Materials




Calibration Curves of Ranitidine Hydrochloride and $NiSO_4$

# V-770 UV-Visible/NIR Spectrophotometer




**Single monochromator, dual gratings and PbS detector for wide wavelength in the NIR region up to 3200 nm.**

The V-770 offers the unique benefit of single monochromator for higher optical throughput compared to double monochromated systems. This is especially useful for diffuse and specular reflectance measurements in the NIR where signal to noise can be a problem.

## System Features

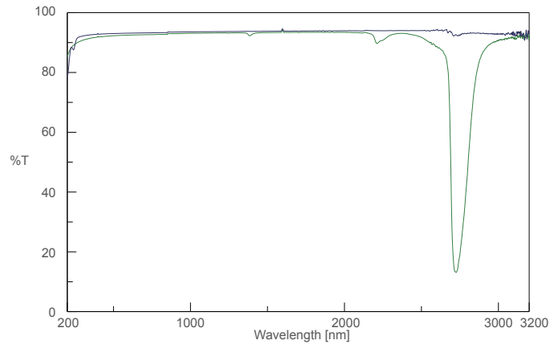
- Double-beam spectrophotometer with single monochromator
- High sensitivity PMT and PbS detectors
- UV-Visible and NIR optimized gratings
- Wide wavelength range PbS detector
- Wide wavelength range – 190 to 2700 nm (3200 nm as option)
- Variable spectral band-width
- High-speed scanning up to 4,000 nm/min (Scanning speed on Preview mode is 8,000 nm/min)
- Stray light 0.005% (UV-visible) to 0.04% and 0.1% (NIR)

## Performance and Application

The V-770 can be used with most absorbance, transmittance or reflectance measurement in the UV-visible to NIR region, including liquids, solids and with options for specular absolute and diffuse reflectance.

## Wide Wavelength Range

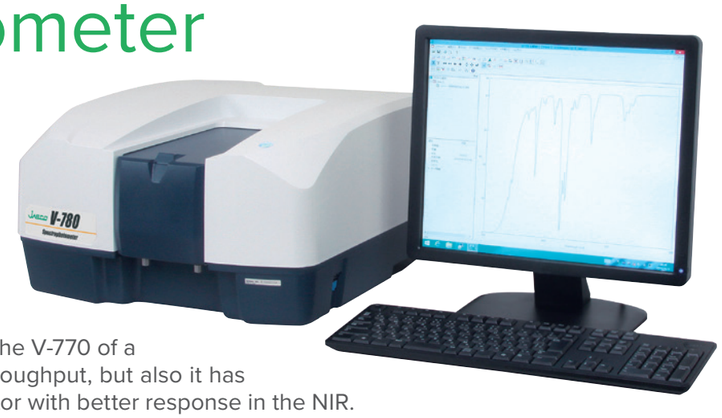
The V-770 uses a combination of wide range monochromator, PbS detector and unhydrous windows to cover the wavelength range to 3200nm. The high optical throughput of a single monochromator design provides excellent signal to noise when measuring transmission, diffuse and absolute reflectance to longer wavelengths.




The NIR UV-Visible spectra shows the water band in a quartz substrate (Blue) compared to anhydrous quartz (Green).



# V-780 UV-Visible/NIR Spectrophotometer




**Single monochromator, dual gratings and InGaAs detector for enhanced sensitivity in the NIR region up to 1600 nm.**

The V-780 has the same unique benefit as the V-770 of a single monochromator for higher optical throughput, but also it has improved sensitivity from the InGaAs detector with better response in the NIR.

## System Features

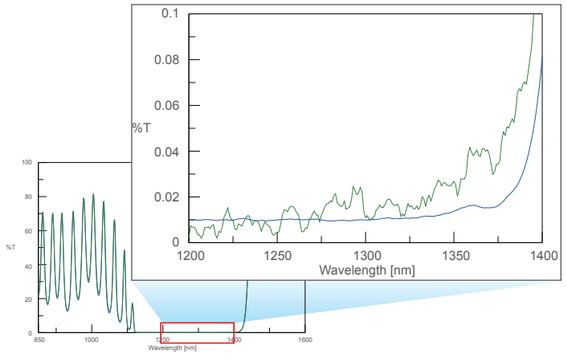
- Double-beam spectrophotometer with single monochromator
- High sensitivity PMT and InGaAs detectors
- UV-Visible and NIR optimized gratings
- Wide wavelength range – 190 to 1600 nm
- Variable spectral band-width
- High-speed scanning up to 4,000 nm/min (Scanning speed on Preview mode is 8,000 nm/min)
- Stray light 0.005% (UV-visible) to 0.04% (NIR)

## Performance and Application

The V-780 can be used with most absorbance, transmittance or reflectance measurement in the UV-visible to NIR region, including liquids, solids and with options for specular absolute and diffuse reflectance in a narrower wavelength range than the V-770 but with higher sensitivity.

## High Sensitivity

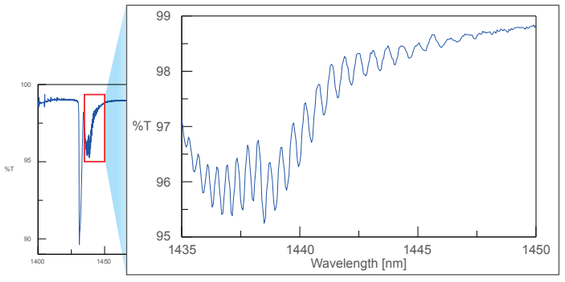
The figure (below) compares a 1.3 µm band cutoff filter for optical communication measured using the V-770 with a Peltier-cooled PbS photo-conductive detector and the V-780 with a Peltier-cooled InGaAs photodiode detector. The V-780 offers significantly increased S/N.




Spectra of 1.3 µm Cut-Off Filter

## High Resolution

The figures (below) show the vibrational NIR spectrum of CO2 gas (pathlength: 100 mm), measured using the V-780. Overtones are seen near 1430 nm. Zooming in shows that the V-780 has excellent resolution for observing the rotational peaks in the vibrational spectrum.




Transmittance Spectrum of CO2 Gas Sample (long term accumulation)

# Temperature Control

## Automatic Peltier Multi-Cell Holders

**PSC-763 | 6-Position (Air-Cooled)**

**PAC-743 | 6 or 8-Position (Water-Cooled)**

**PAC-743R | 6 or 8-Position (Water-Cooled, Thermostatted Reference)**

**Specifications**

| Model | PSC-763 | PAC-743 | PAC-743R |
|---|---|---|---|
| Compatible Cells | Rectangular cells: 10x10, 2x10, 4x10 mm | Please refer to the "PAC-743/743R Cell Accessory Specifications" | |
| Reference | Rectangular cells: 10x10, 2x10, 4x10 mm (1 pc) | | |
| Temperature Control System | Heating/cooling system with Peltier effect (PAC-743R includes temperature controlled reference cell) | | |
| Heat Radiating System | Air cooled | Water cooled | |
| Stirring System | Integrated variable speed magnetic stirrer (10 x 10 mm cell) | Please refer to the "PAC-743/743R Cell Accessory Specifications" | |
| Temperature Setting Range | 10 to 70°C | -10 to 110°C | |
| Temperature Control Range | 15 to 60°C (at 20°C) | 0 to 100°C (at 20°C) | |
| Temperature Setting Precision | ±0.1°C (cell holder sensor) | ±0.1°C | |
| Temperature Accuracy | With cell holder sensor: ±0.5°C (20 to 40°C), ±1°C (other temp range) | | |

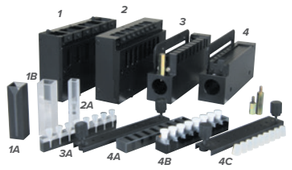
*PSC-763*

*PAC-743*

*PAC-743R*

**PAC-743/743R Cell Accessory Specifications**

| Cell Block Number | Cell Block | Compatible Cells | Cell Number | In Cell Sensor |
|---|---|---|---|---|
| 1 | 6-position | Rectangular quartz cell: 2x10 mm | 1A | 6916-H516A Sensor in cell, 1 pc<br>6916-H517A Sensor in cell, 6 pcs |
| | | Rectangular quartz cell: 4x10 mm | - | |
| | | Rectangular quartz cell: 10x10 mm (integrated variable speed magnetic stirrer) | 1B | |
| | | Capillary cell adapter and cell (sealing compound required) *Customized items | - | |
| 2 | 8-position | Rectangular quartz cell: 5x5 mm (integrated variable speed magnetic stirrer) | 2A | 6916-H516A Sensor in cell, 1 pc<br>6916-H518A Sensor in cell, 8 pcs |
| 3 | 1 mm 8-position micro (stirrer function not available) | 2x1 mm (10 µL), Silicon cap kit: 8 silicon caps, 1 silicon cap with sensor hole, cap fixture | 3A | 6916-H516A Sensor in cell, 1 pc<br>*8th cell position only monitor cell block temp |
| 4 | 10 mm 8-position micro (stirrer function not available) | 2x10 mm (10 µL), no well cap | 4A | 6916-H516A Sensor in cell, 1 pc<br>*8th cell position only monitor cell block temp |
| | | 2x10 mm (10 µL), Teflon caps | 4B | |
| | | Silicon cap kit: 8 silicon caps, 1 silicon cap with sensor hole, cap fixture | 4C | |




## Peltier Thermostatted Single Cell Holders

**EHCS-760 | Single Position Cuvette (Air-Cooled)**

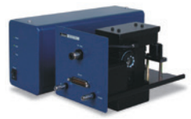
**ETCS-761 | Single Position Cuvette (Water-Cooled)**

**ETCR-762 | Single Position Cuvette (Water-Cooled, Thermostatted Reference)**

**Specifications**

| Model | EHCS-760 | ETCS-761 | ETCR-762 |
|---|---|---|---|
| Compatible Cells | Rectangular cell, 10 x 10, 2 or 4 x 10mm, 1 pc | | |
| Temperature Control | Sample Only | | Sample and Reference |
| | Heating/Cooling system using Peltier effect | | |
| Heat Radiating System | Air-Cooled | Water-Cooled | |
| Stirring System | Integrated variable speed magnetic stirrer (10 x 10 mm cell) | | |
| Temperature Setting Range | 5 to 70°C | -10 to 110°C | -10 to 110°C |
| Temperature Control Range | 10 to 60°C (at 25°C) | 0 to 100°C (for cooling water temperature at 20°C) | |
| Temperature Control Accuracy | ±0.1°C (cell holder sensor) | | |
| Temperature Accuracy | With cell holder sensor: ±0.5°C (20°C to 40°C), ±1°C (other temp. range)<br>With optional temp. sensor: ±0.2°C | | |

*EHCS-760*



*ETCS-761*

**Options**

| | |
|---|---|
| Cell Mask Kit | Sample Masks and cell-height adjustment for the cell position (a 2 mm path width micro cell can be used to measure sample with a min. 100 µL volume. |
| OPS-515 | Optional sensor used to monitor the temperature inside the sample cell. |
| Cell Spacers | For cells with an optical path length of 1, 2 and 5 mm. (P/N: 6939-0501PA for 2 mm cell, 6916-6018PA for 2 mm cell and 6916-6019PA for 5 mm cell) |
| Capillary Adapter | For V-730/V-730BIO only<br>Used for a capillary cell (minimum sample volume of 3 µL). The optional sensor (OPS-515) in the cell adapter is required for temperature monitoring. (P/N: 6916-H360A Capillary Adapter) |

*ETCR-762*

used only with V-730 **V-730**

used only with V-730BIO **V-730BIO**

used only with V-750 **V-750**

used only with V-760 **V-760**

used only with V-770 **V-770**

used only with V-780 **V-780**

compatible with all V-700 Series instruments **V-700**

# Temperature Control

## Constant Temperature Cell Holders/Cell Changers

The following cell holders can be used with water circulators for maintaining samples at a constant temperature.

**STR-773 | Water Thermostatted Cell Holder with Stirrer**

**HMC-711 | Water Thermostatted Micro Cell Holder**

**MHT-745 | Manual 4-Position Water Thermostatted Turret Cell Holder**

**NCP-706 | Automatic 6-Position Water Thermostatted Cell Changer**

**Specifications**

| Model | STR-773 | HMC-711 | MHT-745 | NCP-706 |
|---|---|---|---|---|
| Compatible Cells | Rectangular cells: 10x10, 4x10, 2x10 mm | Rectangular cells: 10x10, 10x5, 2x10, 4x10, 2x5 mm (50 µL minimum sample volume) | Rectangular cells: 10x10, 4x10, 2x10 mm | Rectangular cells: 10x10, 4x10, 2x10 mm |
| Temperature Control | Thermostatted water circulation for sample and reference | | | |
| Operating Temperature | 10 to 90°C | | | |
| Additional | Integrated variable speed magnetic stirrer (2 mm micro cell cannot be used with the stirrer) | Mask for 100 mL cell (2x10 mm), 200 mL cell (4x10 mm) | -- | Cell switching software controlled |

*STR-773*

*HMC-711*

*MHT-745*

*NCP-706*

## Other Temperature Control Accessories

**CTU-100 | Mini Circulating Water Bath**

**Specifications**

| | |
|---|---|
| Temperature Control Range | Room Temperature -10 to 40°C |
| Temperature Interval | 0.1 °C |
| Bath Volume | Approx. 100 mL |
| Temperature Sensor/Control Accuracy | ±0.2°C / ±0.5°C (at 20°C) |
| Dimensions | 170 (W) x 200 (H) x 311 (D) mm |

*CTU-100*

**CSP-909 | Optional Sample Compartment Lid with Syringe Port**

Used for fast reaction to inject a reaction initiator into the cuvette without opening the sample chamber lid. Can only be used with a 10x10 mm rectangular cell and requires a syringe with 2 inch (50 mm) needle.

Compatible with the following cell holders: STR-773, EHCS-760, ETCS-761, ETCR-762

*CSP-909*





# Ambient Accessories

used only with V-730 **V-730**
used only with V-730BIO **V-730BIO**
used only with V-750 **V-750**
used only with V-760 **V-760**
used only with V-770 **V-770**
used only with V-780 **V-780**
compatible with all V-700 Series instruments **V-700**

## Liquid and Film Cell Holders/Cell Changers

**LSE-701 | Long Path Cell Holder**

**FSE-702 | 4-Position Manual Long Path Cell Changer**

**SSE-704 | 6-Position Manual Cell Changer**

**NCP-705 | 6-Position Automatic Cell Changer**

**CYH-708 | Cylindrical Cell Holder**

**Specifications**

| Model | LSE-701 | FSE-702 | SSE-704 | NCP-705 | CYH-708 |
|---|---|---|---|---|---|
| Compatible Cells | Rectangular cell, pathlength 10, 20, 50 or 100 mm, 1 pc | Rectangular cell, pathlength 10, 20, 50 or 100 mm, 4 pcs | Rectangular cell, pathlength 10 or 20 mm, 6 pc | Rectangular cell, pathlength 10 mm, 6 sample positions | Cylindrical cells, Φ22 or 30mm pathlength 10, 20, 50 or 100 mm, 1 pc |
| Reference | Rectangular cell, pathlength 10, 20, 50 or 100 mm, 1 pc | Rectangular cell, pathlength 10, 20, 50 or 100 mm, 1 pc | Rectangular cell, pathlength 10 or 20 mm, 1 pc | Rectangular cell, pathlength 10 mm, 1 pc | Cylindrical cells, Φ22 or 30mm pathlength 10, 20, 50 or 100 mm, 1 pc |

**FLH-740/FLH-741 | Film Holder**

Used to measure the transmittance of solid and transparent samples such as films, plate glass, and filters.

**Specifications**

| Model | FLH-740 | FLH-741 |
|---|---|---|
| Minimum Sample Size | 15 (H) x 15 (W) x 0.5 (t) mm | 5 (H) x 5 (W) x 0.5 (t) mm |
| Maximum Sample Size | 80 (H) x 100 (W) x 10 (t) mm | 80 (H) x 100 (W) x 25 (t) mm |

**RSH-744 | Rotary Sample Holder**

Used to measure a film (planar) sample, which can be rotated 360° with around the optical axis and the inclination/tilt of the sample versus the source beam can be varied within a range of ±50°.

**Specifications**

| Model | RSH-744 |
|---|---|
| Minimum Sample Size | 10 (H) x 30 (W) x 1 (t) mm |
| Maximum Sample Size | 18 (H) x 38 (W) x 2 (t) mm |
| Angle of Rotation | Optical axis: 360°, Perpendicular to the optical axis: ±50° |

**VTA-752 | Film Holder (Variable Incident Angle)**

Used to measure transmittance of a film-like sample when the incident angle of the light beam is varied. This incident angle can be set in 1° increments with a rotation range of ±90°.

**Specifications**

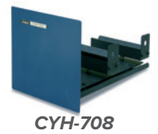
| Model | VTA-752 |
|---|---|
| Minimum Sample Size | 15 (H) x 35 (W) x 1 (t) mm |
| Maximum Sample Size | 80 (H) x 70 (W) x 2 (t) mm |
| Range of Rotation Angle | ±90°C |

*LSE-701*

*FSE-702*

*SSE-704*

*NCP-705*



*CYH-708*

*FLH-740*

*FLH-741*

*RSH-744*

*VTA-752*

# Micro Volume

## Micro-Volume Liquid Transmission Cell Holders

**UCB-710 | Rectangular Cell Holder**
With adjustable height and mask for use with100 µL micro cells. (50 µL as an option)

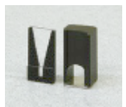
*UCB-710*

**SAH-769 | One Drop Measurement Unit**
For high-speed measurement of micro-volumes of proteins and nucleic acids. 1 mm and 0.2 mm pathlengths with sample volumes of 5 and 0.6 µL, respectively.

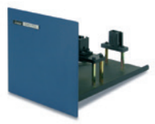
*SAH-769*

**EMC-709 | Micro Cell Holder**
Used with a 50 µL or 5 µL micro cells with an optional spacer.

50 µL Micro Cell



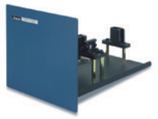
5 µL Micro Cell Spacer



*EMC-709*

**EMC-759 | Ultra-Micro Cell Holder**
Includes focusing optics for use with a 5 µL micro cell only for use with the V-730 and V-730BIO.

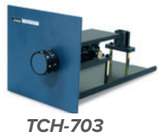
5 µL Micro Cell



*EMC-759*

**TCH-703 | 8-Position Micro Turret Cell Holder**
Eight 4 µL cells arranged on a disc, which can be manually selected for fast and accurate measurement of multiple samples

8-Position Micro Turret Cell (P/N: 6916-4822A)



*TCH-703*

# Optical Fiber Units

**FAV-750 | Optical Fiber Unit**
Optical fiber accessories with external detector, enable the measurement of bulky samples that cannot be placed in the sample compartment or that are in special environments.

**FAN-751 | Optical Fiber Unit**
Optical fiber accessories with external detector, enable the measurement of bulky samples that cannot be placed in the sample compartment or that are in special environments.

*FAV-750*

**Wavelength range: 250 – 800 nm (FAV-750), 250 – 2000 nm (FAN-751).*
**Optical fiber, optical fiber ports, and external sample compartment are optional.*

**FAP-754 | Optical Fiber Unit**
Used for measurement of external samples using fiber probes and the internal detector of the spectrophotometer.
**The optical fiber and optical fiber port must be specified separately as below.*

*FAP-754*

**Fiber Connection Port**
- Bundle type for FAV-750, FAN-751 and FAP-754
- FC connector type for FAV-750, FAN-751 and FAP-754
- SMA connector type for FAV-750, FAN-751 and FAP-754

**ELM-912 | External Light Source Interface**
Used to introduce light from an external light source into the spectrophotometer. It can be used for evaluation of the spectral characteristics or intensity of external light sources.
** A calibrated reference source is required for spectral correction of a measured spectrum.*
** The optical fiber must be ordered separately.*

*ELM-912*

used only with V-730 **V-730**
used only with V-730BIO **V-730BIO**
used only with V-750 **V-750**
used only with V-760 **V-760**
used only with V-770 **V-770**
used only with V-780 **V-780**
compatible with all V-700 Series instruments **V-700**

# Integrating Spheres

used only with V-730 V-730
used only with V-730BIO V-730BIO
used only with V-750 V-750
used only with V-760 V-760
used only with V-770 V-770
used only with V-780 V-780
compatible with all V-700 Series instruments V-700

## ISV-922/ISN-923/ISN-901i | Integrating Sphere, 60 mm diam.

**Specifications**

| Model Name | ISV-922 | ISN-923 | ISN-901i |
|---|---|---|---|
| Instrument | V-750/760 | V-770 | V-780 |
| Inside Diameter of Integrating Sphere | 60 mm diam. | | |
| Minimum Sample Size (Reflectance) | 20 (H) x 20 (W) x 0.5 (t) mm | | |
| Maximum Sample Size (Reflectance) | 65 (H) x 50 (W) x 25 (t) mm | | |
| Sample Cell (Transmittance) | Rectangular cell 5, 10, 20, 30 and 50 mm path length | | |
| Reference Cell (Transmittance) | Rectangular cell 5, 10 and 20 mm path length<br>Reference cell block is optional. | | |
| Wavelength Range | 200-870nm | 200-2500nm | 200-1600nm |
| Incident Angle to Reflection Surface | 0°, approx. 5° | | |

*ISV-922*

**Optional Holders**

### PSH-002 | Powder Sample Holder

For diffuse reflectance measurements of powder samples. Sample: 16 mm dia., thickness: 0.5-6 mm

*PSH-002*

### PSH-003 | Powder Sample Holder

For diffuse reflectance measurements of powder samples. Sample: 5 mm dia., thickness: 0.5-3 mm
*When using the PSH-003, Beam Focus Attachment for Reflectance Measurement is required.

## ILV-924/ILN-925/ILN-902i | Integrating Sphere, 150 mm diam.

**Specifications**

| Model | ILV-924 | ILN-925 | ILN-902i |
|---|---|---|---|
| Instrument | V-750/760 | V-770 | V-780 |
| Inside Diameter of Integrating Sphere | 150 mm diam. | | |
| Minimum Sample Size (Reflectance) | 20 (H) x 20 (W) x 0.5 (t) mm | | |
| Maximum Sample Size (Reflectance) | 100 (H) x 50 (W) x 30 (t) mm | | |
| Sample Cell (Transmittance) | Rectangular cell 5, 10, 20, 30 and 50 mm path length | | |
| Reference Cell (Transmittance) | | | |
| Wavelength Range | 220-850nm | 220-2200nm | 220-1600nm |
| Incident Angle to Reflection Surface | approx. 5° | | |

*ILV-924*

**Optional Holders**

### PSH-002 | Powder Sample Holder

For diffuse reflectance measurements of powder samples. Sample: 16 mm dia., thickness: 0.5-6 mm

### SSH-507 | Solid Sample Holder

For diffuse transmittance measurements of solid samples. Minimum sample size: 20(H) x 20(W) x 0.5(t) mm, Maximum sample size: 70(H) x 30(W) x 40(t) mm

## IJV-726/IJN-727/IJN-904i | Dedicated Gemstone Integrating Sphere

**Specifications**

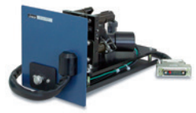
| Model | IJV-726 | IJN-727 | IJN-904i |
|---|---|---|---|
| Instrument | V-750/760 | V-770 | V-780 |
| Inside Diameter of Integrating Sphere | 60 mm diam. | | |
| Minimum Sample Size | 2 mm diam. (Transmittance/Reflectance) | | |
| Maximum Sample Size (Transmittance) | 10 mm diam. | | |
| Maximum Sample Size (Reflectance) | 30 mm diam. | | |
| Wavelength Range | 220-850nm | 220-2000nm | 220-1600nm |

*IJN-727*

## PIV-756/PIN-757/PIN-903i | Horizontal Sampling Integrating Sphere

**Specifications**

| Model | PIV-756 | PIN-757 | PIN-903i |
|---|---|---|---|
| Instrument | V-750/760 | V-770 | V-780 |
| Inside Diameter of Integrating Sphere | 60 mm diam. | | |
| Maximum Sample Size (Reflectance) | 30 x 30 x 10 (t) mm | | |
| Reflectance Measurement Adaptor | 20 mm diam. x 2 mm (no window required) | | |
| Minimum Sample Size (Transmittance) | 3 mm diam. x 0.5 (T) mm | | |
| Maximum Sample Size (Reflectance) | 50(H) x 50(W) x 2(T) mm | | |
| Wavelength Range | 250-800nm | 250-2000nm | 250-1600nm |



*PIN-757*

## SIV-767/SIN-768 | Integrating Sphere with Stirrer

**Specifications**

| Model | SIV-767 | SIN-768 |
|---|---|---|
| Instrument | V-750/760 | V-770 |
| Inside Diameter of Integrating Sphere | 60 mm diam. | |
| Sample Cell (Transmittance) | Rectangular cell 5, 10, 20, 30 and 50 mm path length | |
| Reference Cell (Transmittance) | Rectangular cell 5, 10, 20 mm path length. Reference cell block is optional. | |
| Wavelength Range | 250-800nm | 250-2500nm |
| Incident Angle to Reflection Surface | approx. 5° | |

*SIV-767*

**Optional Holders**

### RLH-603 | Reference Rectangular Cell Holder

Required for reference side when performing diffuse transmittance measurements of turbid liquid samples. 5, 10, and 20 mm pathlength rectangular cells can be used with this cell holder.

### Thermostatted Cell Holder

Allows temperature-controlled diffuse reflectance and transmittance measurements using a 10x10 mm rectangular cell with a temperature range of 10 to 90°C. A thermostatted water circular is required.

## HISV-728/HISN-729 | Portable Integrating Sphere

**Specifications**

| Model | HISV-728 | HISN-729 |
|---|---|---|
| Instrument | V-750/760 | V-770 |
| Inside Diameter of Integrating Sphere | 60 mm diam. | |
| Window Size | 25 mm diam. | |
| Wavelength Range | 250-800nm | 250-2000nm |

*HISV-728*

**Optional Accessories**

### OFV-624/625 | Optical Fiber for HISV-728

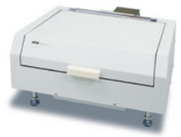
Wavelength range: 250-800 nm, Length: 1 m (OFV-624), 2 m (OFV-625)

### OFN-626/627 | Optical Fiber for HISN-729

Wavelength range: 250-2000 nm, Length: 1 m (OFN-626), 2 m (OFN-627)

# Absolute Reflectance

**ARV-913/ARN-914/ARN-915i | Absolute Reflectance Measurement (Manual Synchronous Type)**
The ARV and ARN accessories are used for absolute reflectance measurements with manual, synchronous movement of the sample stage and detector. The angle of incident of the sample and the detector positions are moved simultaneously, the absolute reflectance of the sample can be measured at varied incident angles.



*ARV-913*

**ARSV-916/ARSN-917/ARSN-918i | Absolute Reflectance Measurement (Manual Asynchronous Type)**
The ARSV and ARSN are used for manual asynchronous movement of the sample stage and detector to obtain independent absolute reflectance and transmittance spectra. Optional polarizers can be used to evaluate the properties of the sample with polarized light.

**ARMV-919/ARMN-920/ARMN-921i | Automated Absolute Reflectance Measurement Accessory**
The ARMV and ARMN automate absolute reflectance measurement. An integrating sphere also allows measurement of the relative reflectance of a diffusely reflecting sample. Since the angles of the sample stage and the detector can be changed independently, the absolute reflectance and transmittance can be measured with varied angles of incidence. A software controlled polarizer is included as standard for evaluation of the polarization properties of a sample. In addition to S and P polarizations, N polarization obtains the same measurement results as non-polarized light.
*Please note that ARMV-919, ARMN-920 and ARMN-921i cannot work with iRM-1000.

*ARMV-919*

**Specifications**

| Model | | ARV-913 | ARN-914 | ARN-915i | ARSV-916 | ARSN-917 | ARSN-918i | ARMV-919 | ARMN-920 | ARMN-921i |
|---|---|---|---|---|---|---|---|---|---|---|
| Instrument | | V-750/760 | V-770 | V-780 | V-750/760 | V-770 | V-780 | V-750/760 | V-770 | V-780 |
| Wavelength Range | | 250-850 mm | 250-2000 mm | 250-1600 mm | 250-850 mm | 250-2000 mm | 250-1600 mm | 250-850 mm | 250-2000 mm | 250-1600 mm |
| Movement of Sample Stage and Detector | | Synchronous | | | Asynchronous | | | | | |
| Control of Sample Stage and Detector | | Manual | | | | | | Automated | | |
| Measurement Mode | | Absolute reflectance, Relative reflectance | | | Absolute reflectance, Relative reflectance, Transmittance | | | | | |
| Integrating Sphere | | 60 mm diam. | | | | | | | | |
| Incidence Angle | | Absolute reflectance mode: 5° to 60°, Relative reflectance mode: Vertical incidence | | | | | | | | |
| | | - | | | Transmittance mode: 0° to 60° | | | | | |
| Angle Setting | | 2.5° step (manual) | | | Sample stage: 0.1° step (manual)<br>Detector stage: 1° step (manual) | | | 0.1° step automatic | | |
| Sample Size | Absolute reflectance mode: Min. | 20 (H) x 20 (W) x 1 (t) mm | | | | | | | | |
| | Absolute reflectance mode: Max. | 70 (H) x 100 (W) x 10 (t) mm | | | | | | 70 (H) x 70 (W) x 10 (t) mm | | |
| | Relative reflectance mode: Min. | 20 (H) x 20 (W) x 0.5 (t) mm | | | | | | | | |
| | Relative reflectance mode: Max. | 70 (H) x 100 (W) x 10 (t) mm | | | | | | 70 (H) x 70 (W) x 10 (t) mm | | |
| Accuracy | | ±1.5% at incidence angle of 6° | | | | | | | | |
| 100% Line Flatness | | Within ±1% | | | | | | | | |
| Polarizer | | Option (ARG-476 Polarizer) | | | | | | Standard | | |
| Standard Software | | N/A | | | | | | Absolute reflectance spectral measurement, Interval analysis | | |

**Optional Accessories**

**SSH-508 | Solid Sample Holder**
Used at the entrance to the detector for diffuse transmittance measurement.

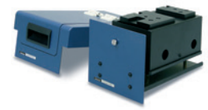
**PDU-926 | Phase Difference Measurement Unit**
Uses an angle selective analyzer to obtain reflectance and transmittance phase difference measurements. The VWAP-794 Phase Difference Measurement program is required. Wavelength range: 250 – 850 nm (ARV-913/ARSV-916/ARV-919), 250 - 2000 nm (ARV-914/ARSV-917/ARV-920), 250 – 1600 nm (ARV-915i/ARSV-918i/ARV-921i). Polarization rotation angle: 0-90°.

**Wide Incident Angle Sample Holder**
Widens the angle of incidence up to 85° (minimum angle is 0°). Minimum sample size: 30(H) x 60(W) x 1(t) mm (ARV/ARN), 30(H) x 60(W) x 1(t) mm (ARSV/ARSN/ARMV/ARMN), Maximum sample size: 70(H) x 100(W) x 10(t) mm.



# Specular Reflectance

**SLM-907/SLM-908 | Spectacular Reflectance Accessory**
Measure the relative specular reflectance of a sample using an aluminum-deposited plane mirror as a reference. The SLM can be used to measure the reflectance and thickness of metal-deposited films. The SLM-908 can measure larger samples such as 6 inch silicon wafers.



*SLM-907*

*SLM-908*

**Specifications**

| Model | SLM-907 | SLM-908 |
|---|---|---|
| Angle of Incidence | Approx. 5° fixed | |
| Maximum Sample Size | 100 x 120 mm | 150 mm dia. (Accommodating 6-inch Wafer) |
| Minimum Sample Size | 10 x 10 mm | |
| Beam Port Diameter | 7 mm diam. (2 mm, 4 mm diam. options) | 7 x 7 mm |
| Reflection Reference | Aluminum-deposited plane mirror (standard) | |
| Wavelength Range V-730 | 250-1000 nm | - |
| V-750/760 | 200-870 nm | |
| V-770 | 200-2500 nm | |
| V-780 | 200-1600 nm | |
| Sample Chamber Lid | Standard | |

**Optional Accessories**

**MSK-001 | Sample Stage with Φ 2 mm Port**
Minimum sample size: 3x3 mm, Maximum sample size: 50x50 mm

**MSK-002 | Sample Stage with Φ 4 mm Port**
Minimum sample size: 5x5 mm, Maximum sample size: 50x50 mm

## Polarizer, Depolarization Plate

**GPH-506 | Polarizer**
Linear polarizer for the incident beam entering the sample compartment. The plane of polarization can be set at 0° or 90°. Spectral range from 215 to 2,300 nm.

*GPH-506*

**DPL-515 | Depolarization Plate**
Ensures that the incident light is non-polarized. Non-polarization is obtained with the rotation angle set to 45°. Spectral range is from 350 to 2,500.

*DPL-515*

used only with V-730 **V-730**
used only with V-730BIO **V-730BIO**
used only with V-750 **V-750**
used only with V-760 **V-760**
used only with V-770 **V-770**
used only with V-780 **V-780**
compatible with all V-700 Series instruments **V-700**

# Autosampler, Sippers & Flow Cells

used only with V-730 V-730
used only with V-730BIO V-730BIO
used only with V-750 V-750
used only with V-760 V-760
used only with V-770 V-770
used only with V-780 V-780
compatible with all V-700 Series instruments V-700

**ASU-800 | Autosampler Unit**
Automates the measurement of multiple liquid samples when used with a sipper or syringe pump. Various optional racks can be used with a range of test tubes, vials or microplates.

**Dust Cover**
ASU-800 protective cover.

**Specifications**

| Compatible Pump | Type |
|---|---|
| NQF-781 | Vacuum Sipper |
| NQF-783 | Vacuum Sipper with Long-Path Flow Cell |
| NPF-782 | Peristaltic Sipper |
| ASP-849 | Syringe Pump |

*Option Racks*

| | Rack | Sample | Max No. of Samples |
|---|---|---|---|
| SRA-811 | 15 mm O.D. Test Tube | 10 mL | 100 |
| SRA-812 | 13 mm O.D. Test Tube | 7 mL | 100 |
| SRA-813 | 12 mm O.D. Test Tube | 5 mL | 150 |
| SRA-814 | 10 mm O.D. Test Tube | 3 mL | 150 |
| SRA-816 | Micro Plate Rack | 1 mL | 196 |
| SRA-818 | Vial Rack | 1.5 mL | 120 |

*ASU-800*

*Dust Cover*

**ASP-849 | Syringe Pump**
Used with the ASU-800 and SFC-712 flow cell holder. The syringe pump is suitable for measurement of small sample volumes. The unit includes a 2.5 mL syringe (1, 5, and 10 mL are optional).

**Specifications**

| | |
|---|---|
| Reproducibility of Volume Delivery | Within ±1% |
| Syringe Capacity | 2.5 mL (1, 5, 10 mL options) |

*ASP-849*

**NQF-781 | Vacuum Sipper**
Vacuum sipper for fast measurement, the sample cannot be recovered. Path length 10mm.

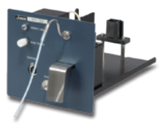
**NQF-783 | Vacuum Sipper with Long-Path Flow Cell**
Vacuum sipper for fast measurement, the sample cannot be recovered. Path length 50mm.

**NPF-782 | Peristaltic Sipper**
Peristaltic sipper with sample recovery. Path length 10mm, can also be used with standard 10x10mm cuvette by switching-out the flow cell.

**Specifications**

| | NQF-781 | NPF-782 | NQF-783 |
|---|---|---|---|
| Light Path Length | 10 mm | | 50 mm |
| Cell Capacity | Approx. 50 µL | | Approx. 1.4 mL |
| Cell Material | Quartz | | |
| Carryover | Less than 1% | | |
| Minimum Sample Requirement Processing capacity 450 samples/hr | 0.7 mL with low-viscosity samples | | 2.4 mL with low-viscosity samples |
| Wavelength Range | 220 - 900 nm (V-730/750/760) | | |
| | 220 - 1600 nm (V-780) | | |

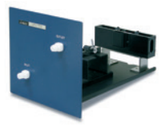
*NQF-781*


*NPF-782*

**SFC-712 | Flow Cell Holder**
Flow cell holder, select from 5 or 10 mm pathlength flow cells with a volume of 50 and 100 µL, respectively.

*SFC-712*

**LFC-713 | Long Path Flow Cell Holder**
Flow cell holder, select from 30, 50, and 100 mm pathlength flow cells with a volume of 0.6, 1, and 2 mL, respectively.


*LFC-713*

**MFC-714 | Micro Flow Cell Holder**
Stainless-steel flow cell with 10 mm pathlength and 20 µL volume.

*MFC-714*

**FIC-715 | Micro Flow Cell Holder**
Teflon flow cell with 10 mm pathlength and 20 µL volume.

*FIC-715*

**AWU-828 | Washing Unit**
Automatic washing system for the ASU-800 autosampler. For use with NQF-781, NQF-783 and NPF-782 sippers.

*AWU-828*

## Automated Systems with ASU-800 and V-730

ASU-800 with NPF-782 Peristaltic Sipper

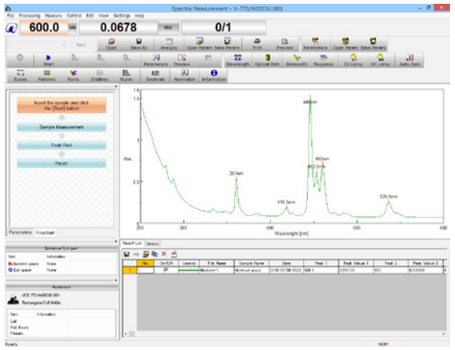
ASU-800 with ASP-849 Syringe Pump and SFC-712 Micro Flow Cell

ASU-800 with NQF-781 Vacuum Sipper

# Spectra Manager™ Software Suite

### Instrument Control

Spectra Manager™ includes control of a wide range of instruments with easy to edit parameter files and data processing functions. Data acquired from the instrument is automatically loaded into an analysis program to free up the PC and control software to acquire further data during post-acquisition processing. Each instrument also has its own range of dedicated applications for analysis, instrument diagnostics and validation.

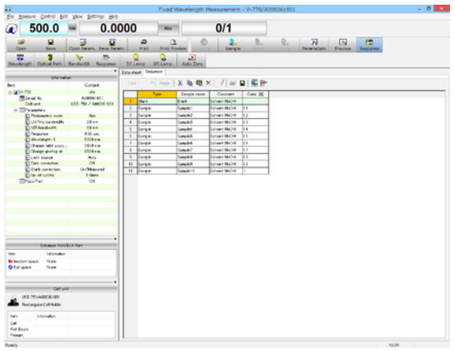


### Flexible Display Features

User-friendly features include flexible customization of the GUI, user-adaptable toolbars and sophisticated handling of spectral and time course data in two- and three- dimensions.

### Data Processing and Spectral Analysis

View and process the different types of measurement data (UV-Vis/NIR, FTIR, Fluorescence, CD) in a single window, using a comprehensive range of data processing functions. Features include instrument specific corrections and analysis, arithmetic operations, derivatives, peak detection, smoothing, and baseline correction.



### Wide Range of Standard and Optional Programs

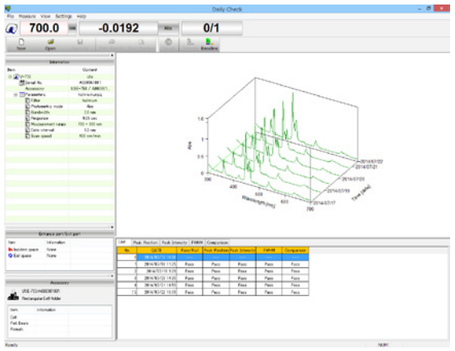
Spectra Manager has a diverse range of instrument specific applications for data analysis and interpretation.

### Reporting

JASCO Canvas allows the creation of bespoke layout templates of spectral data and results to meet individual reporting requirements.

### Macro Command Program

This Macro Command Program can be used to develop user-designed applications for individual experimental set-up and measurement, including instrument control, data acquisition, post-acquisition data processing and reporting.



### Regulatory Compliance with Spectra Manager™ CFR

Spectra Manager CFR provides secure access and compliance with 21 CFR Part 11. System access requires a username and password, assigned by the Workgroup Manager. Security levels define access to administrative tools for the installation of instruments and analysis applications, user and workgroup setup, security policies, as well as system and application history logs. Three levels of electronic signatures are provided, including creation, review, and approval. An audit trail, which is overseen by Windows security, monitors the transaction log for any changes to parameters or data files.

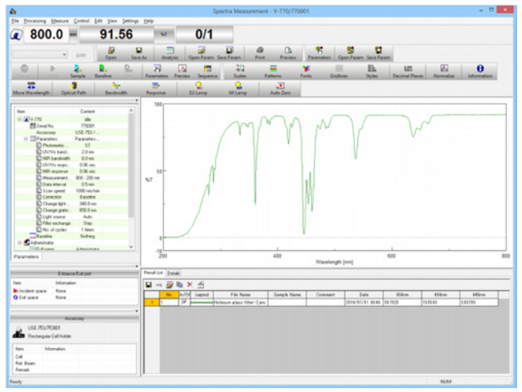
## A SINGLE PLATFORM FOR EVERY INSTRUMENT.

JASCO is the only manufacturer to have developed a single, cross-platform 64-bit Windows software package for operating a wide range of spectroscopic instrumentation. Spectra Manager™ is a comprehensive lab companion for designing experimental measurement and processing data, eliminating the need to learn multiple software programs and allowing data from more than one instrument to be displayed and analyzed together on the same computer.

# Standard Measurement Programs

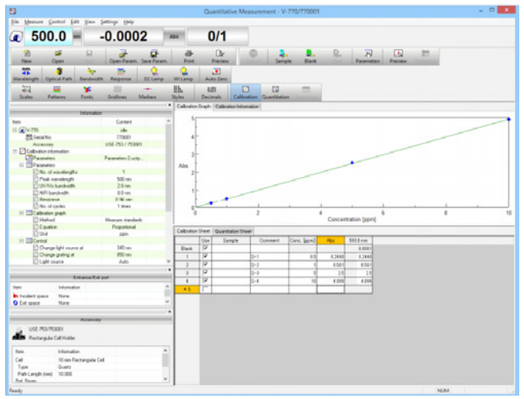
## Spectra Measurement

Measures the absorbance, transmittance, or reflectance spectrum of a sample. Sequential measurements can also be made on multiple samples, each of which can be assigned different measurement parameters. A customizable flowchart can be used to automate the flow of measurement, data processing, saving and reporting functions.



## Quantitative Measurement

Create a calibration curve using the absorbances of standards with known concentrations, and then use the absorbance for samples with unknown concentrations to interpolate the concentration from the calibration curve. Several quantitation methods are included. The calibration curve can be constructed using linear or polynomial fitting with linearity criteria and 'goodness of fit' statistics.

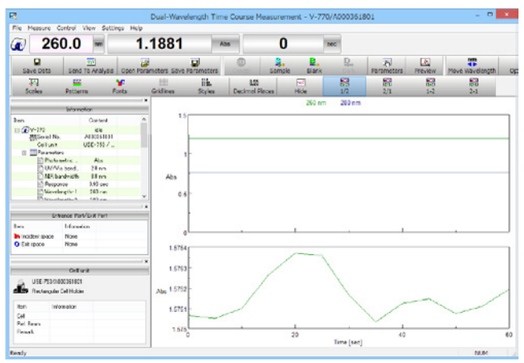


## Time Course Measurement

Measure changes in absorbance, transmittance, or reflectance over a specified time at a fixed wavelength. This can be used for kinetics measurement or stability testing.

## Dual-Wavelength Time Course Measurement

Measure changes in absorbance, transmittance, or reflectance over a specified time at up to two fixed wavelengths. This can be used for kinetics measurement or stability testing.

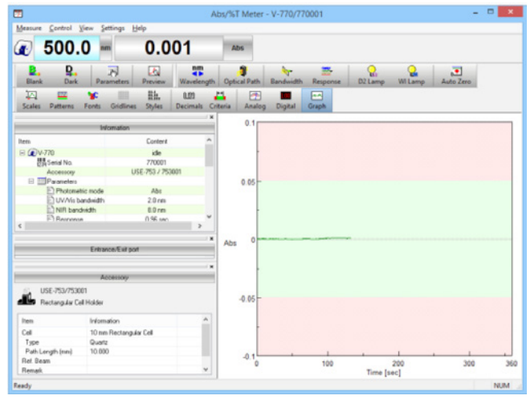


## Fixed Wavelength Measurement

Measure the absorbance, transmittance, or reflectance of a sample at a fixed wavelength. Up to twenty different wavelengths can be used for measurement.

## Abs/%T Meter

The photometric value in absorbance or transmittance is displayed in analog, digital, or graphical modes.



## Parallel Kinetics Measurement

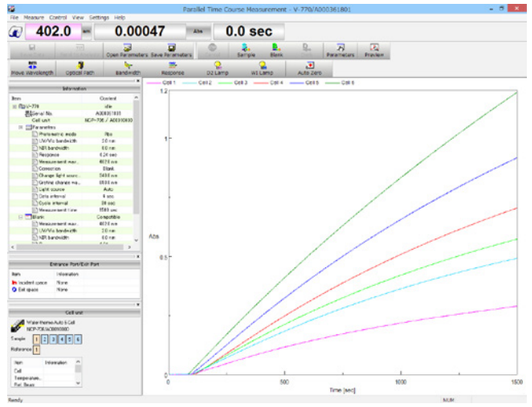
Measures changes in the absorbance, transmittance, or reflectance at a fixed wavelength for a sample(s) over a specified time period, and is designed for use with a multi-cell changer.

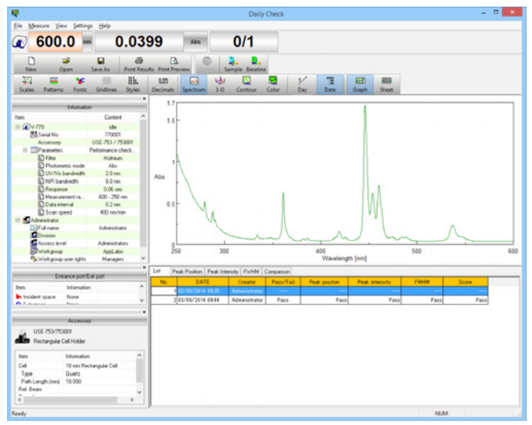
## Validation

Check the functional performance of a UV-Visible/NIR spectrophotometer using a variety of inspection methods, including those required by regulatory compliance. These include wavelength accuracy and repeatability, photometric accuracy and repeatability, resolution, stray light, noise level, and baseline stability and flatness.

## Daily Check

This simple performance check of the spectrophotometer can be made regularly by measuring the absorbance spectrum of a holmium standard supplied with the instrument. The statistics are accumulated over a period of time to monitor and ensure continuous optimal operation.





# Optional Programs

## Bio Applications

**VWTP-959 | Temperature Control Measurement and DNA Melting Analysis**
Temperature Control Measurement Program performs thermal melting measurement by monitoring changes in the photometric value of samples at a fixed wavelength with change in temperature. The melting temperature can be calculated from the measured temperature-dependent data using the Melting Temperature Calculation program. A Peltier thermostatted cell holders is required.

The DNA Melting Analysis Program estimates the melting temperature of a protein or nucleic acid based on temperature-dependent data using either the Temperature Control Measurement or Temperature Interval Scan Measurement programs. The melting temperature can be calculated using any of three methods: 2nd derivative, Least squares, and One-point.

**VWPN-952 | Protein/Nucleic Acid Measurement**
Measure spectra or fixed wavelength of proteins and/or nucleic acids and calculates the sample concentration. Quantitation can be made using one of six fixed methods or a user-defined method.

**VWKN-722 | Advanced Kinetic Analysis**
Calculate initial velocity, v, of enzymatic reactions based on time-course data, and velocity parameters (maximum velocity, Vmax, Michaelis-Menten constant, Km, and the Hill coefficient, n) based on a plot of the initial velocity, v, versus the substrate concentration [S]. The enzymatic activity can also be determined.

**VRBP-790 | Bio Package**
The Bio Package for Intelligent Remote Module and Spectra Manager Version includes: *Protein Nucleic Acid Measurement, Kinetics Analysis, Temperature Control Measurement,* and *DNA Melting Analysis.*

## Interval Measurement

**VWIS-957 | Interval Scan Measurement**
Measure changes with time for sample absorbance at up to four wavelengths, as well as for a selected wavelength range. The measurement time interval can also be set in either minutes or seconds for up to 24 days of continuous measurement (maximum time interval is 1 day). Up to 60,000 spectra can be saved in a single interval scan measurement file.

**VWTS-958 | Temperature Interval Scan Measurement**
Measure spectral scans at selected temperature intervals. Temperature-dependent data can also be monitored at up to four wavelengths with a temperature ramp range from 0.1 to 10°C/min, depending on the type of temperature controlled cell holder. The sample temperature can be monitored and/or controlled either using the cell holder sensor or a temperature probe inserted into the cell. Stirring may be available depending on the cell holder.
**A peltier thermostatted cell holders are required.*

## Reflectance Measurement

**VWAM-968 | Absolute Reflectance Spectra Measurement**
Measure reflectance and transmittance spectra by setting the incidence and detection angles. For reflectance measurements, the incident angle can be set from 5 to 85° and from 0 to 85° for transmittance measurements. S- (0°), P- (90°), or N- (45°) polarization can be set for the incident light.
**This program is included in ARMV-919, ARMN-920 and ARMN-921i as standard.*

**VWAS-969 | Absolute Reflectance with Variable Incident Angle Measurement**
Measures the angular dependence of the reflectance and transmittance spectra by setting the incident and detection angles, for up to 20 wavelengths. For reflectance measurements, the incident angle can be set from 5 to 85° and from 0 to 85° for transmittance measurements. S- (0°), P- (90°), or N- (45°) polarization can be set for the incident light.
**Absolute Reflectance Measurement Unit is required.*

**VWAP-970 | Phase Difference Spectra Measurement**
Automatically measure transmittance and reflectance phase difference spectra with multiple incident angles using an automated absolute measurement accessory. The spectrum can be measured by rotation of either polarizer or analyzer.
**This program is included in PDU-926 as standard.*

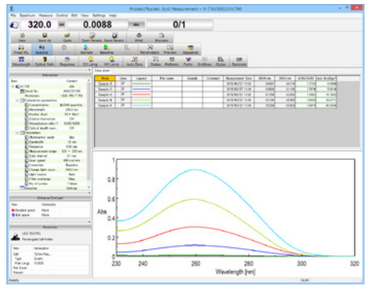
## Material Analysis

**VWSD-961 | Spectrum Diagnosis**
Perform data processing with pass/fail evaluation on a measured spectrum based on photometric values at a specified wavelength, full width at half maximum, peak photometric values, peak wavelengths etc. Sequential measurements can also be carried out on multiples samples, each of which can be assigned different sample measurement parameters.

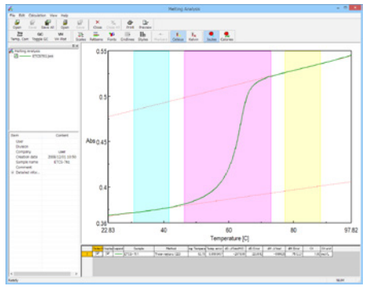
**VWML-791 | Multi-Layer Film Thickness Analysis**
Use a reflectance spectra and select a multilayer model to calculate the refractive index (n), extinction coefficient (k), and layer thickness (d) of an unknown layer(s) using a least square method. Standard libraries are included for metals, semiconductors and isolators. The user can also create their own library.
**Absolute Reflectance Measurement Unit is required.*

**VWBG-773 | Band Gap Calculation**
Calculate the band gap of a semiconductor sample from its spectrum. The following calculation methods can be selected:
- Direct transition: allowed
- Direct transition: forbidden
- Indirect transition: allowed
- Indirect transition: forbidden

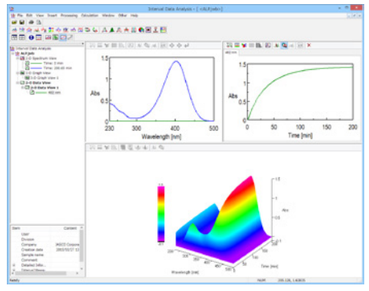
compatible with 21 CFR Part 11 CFR



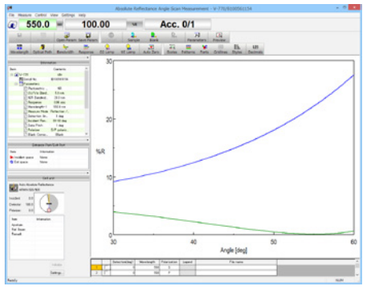
Protein/Nucleic Acid Measurement



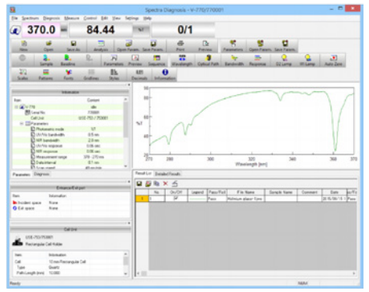
Melting Analysis



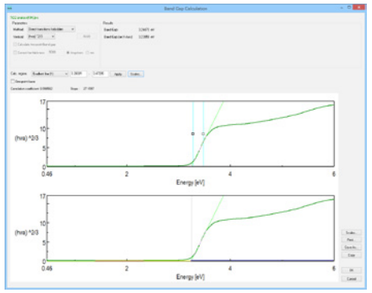
Interval Data Analysis



Absolute Reflectance Angle Measurement



Spectra Diagnosis



Band Gap Calculation

# Optional Programs

## Quantitation and Chemometrics

**VWQM-978 | Spectrum Quantitative Measurement**
Measure the spectrum of a sample and perform quantitation using either the absorbance at a specified wavelength, or the peak absorbance for a standard sample with maximum concentration. The quantitation method can be selected from the following: no base (1-wavelength quantitative analysis), one-point base (2-wavelength quantitative analysis), or two-point base (3-wavelength quantitative analysis).

**VWSQ-776 | Spectral Quantitative**
This program can create calibration curves for multiple components, and can perform quantitative analysis on samples having multiple components simultaneously.

**VWCL-954 | CLS Quantitative Measurement**
Measure samples and automatically perform a quantitative analysis using the classical least squares (CLS) method. A CLS calibration model must first be created and contains correlation curves for quantifying the normal absorbance of the components to be analyzed.

**VWPC-955 | PCR Quantitative Measurement**
Measure samples and automatically perform a quantitative analysis using the principle component regression (PCR) method. A PCR calibration model must first be created and contains correlation curves for quantifying the normal absorbance of the components to be analyzed.

**VWPL-956 | PLS Quantitative Measurement**
Measure samples and automatically perform a quantitative analysis using the partial least squares (PLS) method. A PLS calibration model must first be created and contains correlation curves for quantifying the normal absorbance of the components to be analyzed.

**VWPA-785 | PCA Analysis**
This program can create the PCA model from the spectrum of a known substance and can predict the classification of an unknown sample from the spectrum by using the PCA model.

## Color Analysis

**VWCD-960 | Color Evaluation – Color Diagnosis**
Comprehensive color analysis software with calculations to several different color standards including ASTM, ISO and JIS. Color and color differences are calculated from an absorbance spectrum measured from 360-830 nm. Chromaticity coordinates are plotted in the selected color system. Comparison can also be made to previously measured color spectra.

**VWCM-795 | Computer Color Matching Analysis**
Match a spectrum with a target color using a library created with the Computer Color Matching Library program. The Color Matching Library program allows a total of 16 reference color spectra to be registered, edited, deleted, and displayed. All color matching calculation parameters, such as selecting the reference color library, color system, color matching function, standard observer, and light source, can be user defined.

**VWAC-974 | ASTM Color Analysis**
Calculate the sum of the tristimulus values (X, Y, Z) and optical density from a sample absorbance, reflectance, or transmittance spectrum and obtain the ASTM color. The ASTM color, sum of optical densities, and tristimulus values are all reported. The ASTM color analysis can only be performed in the wavelength range between 380 to 780 nm.

**VWSC-975 | Saybolt Color Analysis**
Calculate the Saybolt color of a sample spectrum for wavelengths between 380 to 780 nm, according to the XYZ color system described by the International Commission on Illumination (CIE).

**VWLU-963 | Luminous Color Measurement**
Measure the luminescence spectrum for a sample and calculate its chromaticity using the Luminous Color Analysis program, pass/fail criteria can also be included. To correct for the spectrophotometer's instrument characteristics (i.e. wavelength-dependent grating efficiencies and detector sensitivities), spectral correction can be made using a standard light source.
**not for use with the V-730. External light source interface and calibrated reference source are required.*

## Solar Measurement and Sun Protection

**VWST-964 | Solar Transmittance/Reflectance Measurement**
Measure the spectral transmittance and reflectance of a sample and calculates the solar reflectance, transmittance, and absorptance, as well as the light transmittance, reflectance etc.
**V-770 only. Integrating sphere is required.*

**VWSP-966 | SPF/PA Calculation**
Using an integrating sphere, this application is used for evaluating the criteria the sun protection factor (SPF) and PA for sunscreens and cosmetics
**requires an integrating sphere and SPF cell*

**VWUP-967 | UPF Measurement**
Used to measure the transmittance of a sample to calculate the ultraviolet protection factor (UPF), UPF rating, UVA transmittance and blocking, and UVB transmittance and blocking according to a variety of standards.
**cannot be used with a V-730, requires an integrating sphere*

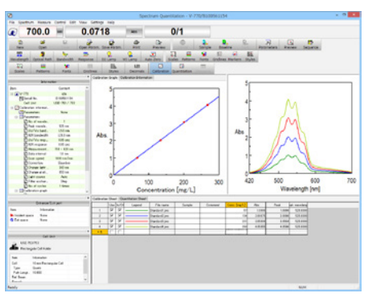
**VWSE-798 | UV Shield Factor Calculation**
Calculate the UV shield factor for a specified wavelength range from a transmittance, reflectance, or absorbance spectrum. A maximum of five wavelength ranges can be specified.

## Haze and Turbidity Measurement

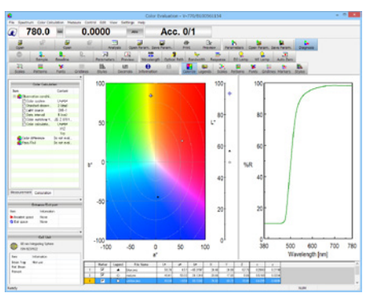
**VWWQ-953 | Chromaticity/Turbidity Measurement**
Measure the absorbance or transmittance of a sample in order to determine its chromaticity or turbidity. The turbidity can also be measured using an integrating sphere in order to evaluate both transmitted and scattered light.

**VWHZ-965 | Sample Haze Calculation**
Using an integrating sphere, the measured total luminous transmittance and diffuse transmittance spectra are used to calculate haze. Criteria can be specified to perform a pass/fail evaluation.
**cannot be used with a V-730, requires an 150 mm dia. integrating sphere*

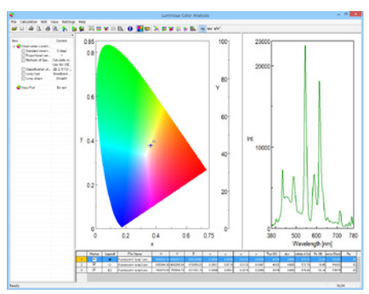
compatible with 21 CFR Part 11 **CFR**



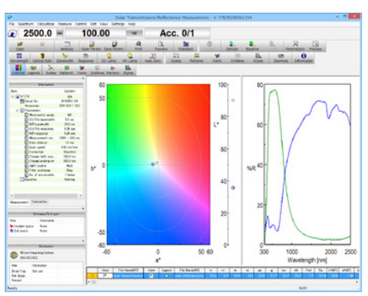
Spectrum Quantitation



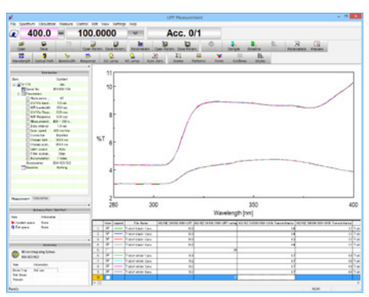
Color Evaluation



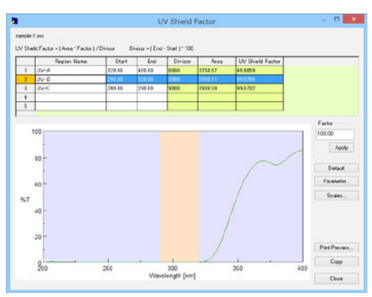
Lumious Color Measurement



Solar Transmittance/Reflectance Measurement



UPF Measurement



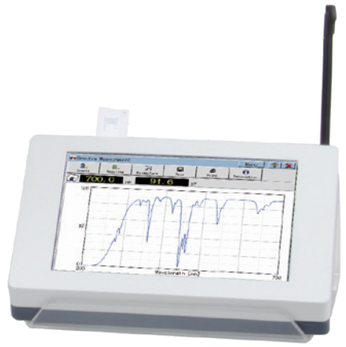
UV Shield Factor Calculation

# iRM-1000
# Intelligent Remote Module

**The iRM-1000 intelligent remote module** incorporates a color LCD touch screen for simple operation and data measurement. The iRM-1000 conveniently guides the operator through everything from data acquisition to data processing and re porting. Results a USB memory for further processing using Spectra Analysis on a PC or laptop.

Easy Data Transfer to a PC

Touch-Sensitive Screen



iRM-1000

- High quality color LCD display
- Operation using finger or Touch Pen
- Spectra, fixed wavelength and quantitative analysis
- Validation
- Print to a USB printer
- Save data to a USB memory

## Standard Measurement Programs for iRM

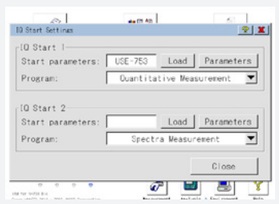
**Spectra Measurement**
**Time Course Measurement**
**Quantitative Analysis**
**Fixed Wavelength Measurement**
**Abs/%T Meter**
**Macro Command**
**Validation**
**Daily Check**

## Standard Analysis Programs for iRM

**Spectra Analysis**
**Enzymatic Reaction Rate Calculation**
**Color Analysis**
**Film thickness**

## Optional Programs for the iRM-1000

**VRBP-790** | **Bio Package**




## IQ Accessory and IQ Start

Includes both IQ Accessory for automatic accessory recognition and IQ Start for quick start of pre-registered parameter files for routine measurements.



# Specifications

| Model | V-730 | V-750 | V-760 | V-770 | V-780 |
|---|---|---|---|---|---|
| Optical System | Rowland off-circle arrangement<br>Single monochromator<br>Double beam type | Czerny-Turner mount<br>Single monochromator<br>Fully symmetrical double beam type | Czerny-Turner mount<br>Double monochromator<br>Fully symmetrical double beam type | Czerny-Turner mount<br>Single monochromator<br>Fully symmetrical double beam type | Czerny-Turner mount<br>Single monochromator<br>Fully symmetrical double beam type |
| Light Source | Halogen lamp, Deuterium lamp (Light source exchange wavelength: Any wavelength between 330 and 350 nm can be selected) | | | | |
| Detector | Silicon photodiode | Photomultiplier tube | | Photomultiplier tube<br>Peltier cooled PbS | Photomultiplier tube<br>Peltier cooled InGaAs photodiode |
| Wavelength Range | 190 to 1100 nm | 190 to 900 nm | 187 to 900 nm | 190 to 2700 nm<br>(3200 nm, option) | 190 to 1600 nm |
| Wavelength Accuracy | ±0.2 nm (at 656.1 nm) | ±0.2 nm (at 656.1 nm) | ±0.1 nm (at 656.1 nm) | ±0.3 nm (at 656.1 nm)<br>±1.5 nm (at 1312.2 nm) | ±0.3 nm (at 656.1 nm)<br>±1.0 nm (at 1312.2 nm) |
| Wavelength Repeatability | ±0.1 nm | ±0.05 nm | ±0.05 nm | ±0.05 nm (UV-Vis)<br>±0.2 nm (NIR) | ±0.05 nm (UV-Vis)<br>±0.1 nm (NIR) |
| Scanning Speed | 10 to 8000 nm/min | 10 to 4000 nm/min (8000 nm/min in preview mode) | | | |
| Slew Speed | 24000 nm/min | 12000 nm/min | | UV-Vis: 12000 nm/min<br>NIR: 48000 nm/min | UV-Vis: 12000 nm/min<br>NIR: 24000 nm/min |
| Spectral Bandwidth (SBW)<br>L:<br>Low Stray Light Mode<br>M:<br>Micro Cell Mode | 1.0 nm fixed | 0.1, 0.2, 0.5, 1, 2, 5, 10 nm<br>L2, L5, L10 nm<br>M1, M2 nm | | UV-Vis:<br>0.1, 0.2, 0.5, 1, 2, 5, 10 nm<br>L2, L5, L10 nm<br>M1, M2 nm<br>NIR:<br>0.4, 0.8, 2, 4, 8, 20, 40 nm<br>L8, L20, L40 nm<br>M4, M8 nm | UV-Vis:<br>0.1, 0.2, 0.5, 1, 2, 5, 10 nm<br>L2, L5, L10 nm<br>M1, M2 nm<br>NIR:<br>0.2, 0.4, 1, 2, 4, 10, 20 nm<br>L4, L10, L20 nm<br>M2, M4 nm |
| Photometric Range | -3 to 3 Abs | -4 to 4 Abs | -4 to 6 Abs | UV-Vis: -4 to 4 Abs<br>NIR: -3 to 3 Abs | UV-Vis: -4 to 4 Abs<br>NIR: -3 to 3 Abs |
| Photometric Accuracy | ±0.0015 Abs (0 to 0.5 Abs)<br>±0.0025 Abs (0.5 to 1 Abs)<br>±0.3 %T<br>Tested with NIST SRM 930 | | | | |
| RMS Noise *1 | 0.00004 Abs | 0.00003 Abs | 0.00003 Abs | 0.00003 Abs | 0.00003 Abs |
| Baseline Flatness | ±0.0005 Abs *2 | ±0.0002 Abs *3 | ±0.0003 Abs *4 | ±0.0002 Abs *5 | ±0.0002 Abs *6 |
| Baseline Stability | ±0.0004 Abs/hour *7 | ±0.0003 Abs/hour *8 | | | |
| Stray Light | 1 % (198 nm KCl 12 g/L)<br>0.02 % (220 nm NaI 10 g/L)<br>0.02 % (340 nm $NaNO_2$ 50 g/L)<br>0.02 % (370 nm $NaNO_2$ 50 g/L)<br>Aqueous solution, SBW: 1.0 nm | 1 % (198 nm KCl 12 g/L)<br>0.005 % (220 nm NaI 10 g/L)<br>0.005 % (340 nm $NaNO_2$ 50 g/L)<br>0.005 % (370 nm $NaNO_2$ 50 g/L)<br>Aqueous solution, SBW: L2 nm | 1 % (198 nm KCl 12 g/L)<br>0.00008 % (220 nm NaI 10 g/L)<br>0.00008 % (340 nm $NaNO_2$ 50 g/L)<br>0.00008 % (370 nm $NaNO_2$ 50 g/L)<br>Aqueous solution, SBW: L2 nm | 1 % (198 nm KCl 12 g/L)<br>0.005 % (220 nm NaI 10 g/L)<br>0.005 % (340 nm $NaNO_2$ 50 g/L)<br>0.005 % (370 nm $NaNO_2$ 50 g/L)<br>Aqueous solution, SBW: L2 nm<br>0.04 % (1420 nm: $H_2O$)<br>0.1 % (1690 nm: $CH_2Br_2$ 50 mm cell)<br>SBW: L8 nm | 1 % (198 nm KCl 12 g/L)<br>0.005 % (220 nm NaI 10 g/L)<br>0.005 % (340 nm $NaNO_2$ 50 g/L)<br>0.005 % (370 nm $NaNO_2$ 50 g/L)<br>Aqueous solution, SBW: L2 nm<br>0.04 % (1420 nm: $H_2O$)<br>SBW: L4 nm |
| Dimensions and Weight | 486(W)x441(D)x216(H) mm<br>15 kg | 460(W)x602(D)x268(H) mm<br>27 kg | 460(W)x602(D)x268(H) mm<br>29 kg | 460(W)x602(D)x268(H) mm<br>29 kg | 460(W)x602(D)x268(H) mm<br>29 kg |
| Power Requirements | 120 VA | 150 VA | 150 VA | 150 VA | 150 VA |

*1: 0 Abs, wavelength: 500 nm, measurement time: 60 sec, response: medium, SBW:1 nm (V-730), 2 nm (V-750,760,770,780)

*2: Value obtained more than two hours after turning on the light source, when the room temperature is stabilized, wavelength: 200 to 1000 nm, response: Slow and wavelength scanning speed: 400 nm/min with smoothing processing

3: Value obtained more than an hour after turning on the light source, when the room temperature is stabilized, wavelength: 200 to 850 nm, response: Slow, SBW: 2 nm and wavelength scanning speed: 400 nm/min with smoothing processing

*4: Value obtained more than an hour after turning on the light source, when the room temperature is stabilized, wavelength: 200 to 800 nm, response: Slow, SBW:2nm, wavelength scanning speed: 400 nm/min with smoothing processing

*5: Value obtained more than an hour after turning on the light source, when the room temperature is stabilized, wavelength: 200 to 2500 nm (200 to 850nm: SBW 2 nm, 850 to 2500 nm: SBW8 nm), response: Slow, wavelength scanning speed: 400 nm/min with smoothing processing

*6: Value obtained more than an hour after turning on the light source, when the room temperature is stabilized, wavelength: 200 to 1600 nm (200 to 850nm: SBW 2 nm, 850 to 1600 nm: SBW4 nm), response: Slow, wavelength scanning speed: 400 nm/min with smoothing processing

*7: Value obtained more than two hours after turning on the light source, when the room temperature is stabilized, wavelength: 250 nm, response: slow

*8: Value obtained more than an hour after turning on the light source, when the room temperature is stabilized, wavelength: 250 nm, response: slow and SBW: 2nm

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