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Selection Guide

Accessories for Agilent Cary UV-Vis-NIR Spectrophotometers

Our comprehensive range of UV-Vis-NIR accessories are designed to help you tailor your setup to match your specific application needs. Selecting the most suitable accessory can be critical for the success of your analysis. Explore the most popular accessories for your Agilent Cary 4000, 5000, 6000i, and 7000 UV-Vis-NIR spectrophotometers. To save space in the guide, the instruments are referred to as "Cary 4/5/6i/7000".

This accessory selection guide considers sample type, size, analytical requirements, and measurement mode. Each accessory listing provides guidance on sample size, considering the available space around the mounting point and the physical limitations of the standard sample holder. For questions about sample size limits or performance considerations specific to your sample, please contact your local Agilent representative.

Please refer to Agilent.com for the latest information.

Contents

Solid - Transmission	2
Solid - Specular	3
Solid - Diffuse	6
Liquid	11
Miscellaneous - Solid	14
Fiber Optics	16
Test Equipment	17

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Solid - Transmission	
Solid Sample Holder **Learn More** – Solid sample holder product page – Solid sample holder flyer	Facilitates transmission measurements of solid samples of various types and sizes, suiting many measurement configurations. Flexible and adaptable for small sample measurement. The holder must be fixed onto the lock-down baseplate before it can be installed into the Cary 4/5/6i/7000. The baseplate is a secure, stable platform for fixed position transmittance measurements of solid samples, with a lock-down mechanism that enables precise and repeatable measurements. The holders fit onto and slide along the optical rails. The sample can be positioned anywhere along the beam to accommodate a variety of sample thicknesses. A series of holders can also be secured along the optical rails. **Specifications** – Two holders are standard with the Cary 5/6i/7000 and are optional for the Cary 4000 – Several aperture masks (as small as 1 mm) are supplied with the holders, allowing beam collimation and small sample measurements. 10 mm aperture sample slide holder, 1 and 5 mm aperture sample slides, and V-plates (3 × 45 mm and 6 × 45 mm) with screws and nuts are also supplied. The holder is versatile and can accommodate different types of solid materials including filters, glass, and polymers. **Physical Sample size** **Maximum:** 140 × 140 mm, 25 mm thickness **Minimum:** limited by choice of aperture or beam size used
Brewster Angle Holder **Learn More** – Brewster Angle Holder product page	The Brewster angle holder fits into the solid-sample holder slide for the Cary 4/5/6i/7000 and allows measurement of the transmission of light through the sample at different angles of incidence, with manual tuning via an easy-to-read dial that accurately sets and reads the AOI. Useful for examining angle-dependent optical properties. Designed to measure thin films at various angles of incidence using transmission spectroscopy. Such measurements are used to extract film thickness and refractive index data from the resulting interference fringes. The Brewster angle holder alters s- and p-polarised light transmission; therefore, it should be used with a polarizer. **Physical sample size** – Maximum: 80 × 80 mm, thickness 3 mm – Minimum: selected beam size
Variable Angle Transmission Holder 	An accessory designed to measure thicker samples at settable angles of incidence using transmission spectroscopy. By enabling dual opposing samples to be mounted, it compensates for beam translations caused by refraction and enables precise transmittance measurements of solid samples at various incident angles, including non-normal AOI. The holder allows flexible positioning of the sample through 360° (to 1°) relative to the incident beam, facilitating detailed analysis. The holder can be rotated 90° around the beam axis. Includes a holder for an optional polarizer (beneficial for optimizing measurement performance of samples that polarize the beam due to the material properties or a high AOI). A solid sample holder is required but not included. **Physical sample size** – Maximum: 40 × 40 mm, thickness 6.5 mm – Minimum: selected beam size

Solid - Specular

Universal Measurement Accessory (UMA)

Learn More

- UMA technical overview
- UMA product page
- Solid sample holder flyer
- Round sample holder flyer
- Cube beamsplitter flyer
- Edge mount flyer

Multi-modal measurement system enables automatic measurement of absolute specular reflectance, transmission and scattering at a wide range of angles and different polarisations, and the ability to move/rotate the detector and sample independently of each other. The UMA accommodates six types of measurement modes.

Detector and sample angles can be set in 0.02° increments using the high-resolution optical encoder located beneath the sample stage.

The UMA is included as part of the Cary 7000 Universal Measurement Spectrophotometer (UMS). For the 4/5/6000i series, the accessory is installed in the sample compartment.

Specifications

- Wavelength range: 190 to 2,800 nm
- Auto polarizer wavelength range: 250 to 2,500 nm
- Horizontal beam divergence range: ± 3.0° down to ± 0.25°
- Vertical beam divergence range: ± 3.0° down to ± 1.0°

Physical sample size

- Maximum: 275 mm diameter if round, 255 mm if detector slide mount has been installed, 235 mm if a depolarizer is mounted in the detector slide mount
- Minimum: limited by choice of beam size, 2 × 2 mm at 0° angle of incidence (AOI)

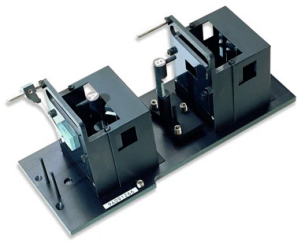
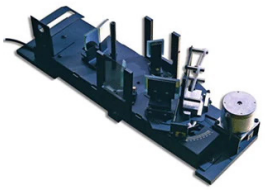
Holders for sample placement in the UMA

- UMA solid sample holder
  Provided as standard with UMA. Measurements can be performed at any AOI. Measurements of reflection, transmission, and absorbance can be taken without adjustment of sample position. Quick-release sample holders for diverse sample types – for example, silica wafers, thin films, coatings, functional glass.
- UMA round sample holder
  Ideal for repetitive measurements of circular samples of different diameters (max. physical thickness of 14 mm) that need to be accurately and reproducibly positioned – for example, routine analysis of identically-sized round optics or coatings applied to circular substrates. Safely and securely mount round samples with minimal (~2 mm) contact around the perimeter of the sample.
- UMA cube beamsplitter holder
  Allows measurement of the optical properties of a cube beam splitter in all the critical angles and directions without having to reposition the sample or interact with the accessory. The holes in the holder in front and behind the sample allow users to mount other sample holders (for example, 10 mm path length cell holders).
- UMA edge mount holder
  Designed for minimum contact – no contact with front or rear sample surface, only edges. Ideal for highly sensitive and fragile samples, for example, double-coated glasses, filters, displays or solar cells. Holder can be rotated on the sample stage around its axis for reflection, transmission, and absorbance measurements at up to 78° AOI, without the need to remount or interact with sample.

The UMA provides absolute %R measurements across an angular range of 5 to 85°, enabling precise and functional specular reflectance measurements. Unlike relative %R specular reflectance accessories, absolute %R is not relative to any other reference standard or baseline material. The accessory is an automated, motor-driven system, completely controlled from the Cary WinUV software, enabling automated, unattended data collection.

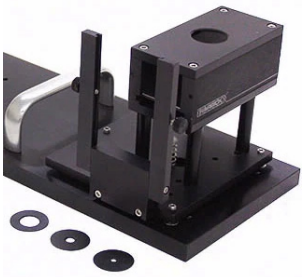
Solid - Specular	

UMA Solids Autosampler
 	
Learn More
– UMA Autosampler product page
– Solids Autosampler flyer
	For use with the UMA. Measure up to 32, 1-inch samples in a single run, or profile large samples (up to 8 inches) for coating uniformity at a spatial resolution down to 2 × 2 mm.
	Autosampler sample holders:
	– The 1-inch round multisample holder is available in two configurations:
	  – Mount up to 32 × 1 in (25.4 mm) diameter samples up to 10 mm thick with maximum AOI 45°, or
	  – Mount up to 24 × 1 in diameter samples up to 10 mm thick with maximum AOI 65°. A central hole within the holder permits re-baselining at user definable points during a long collect.
	– 8-inch round wafer holder: Mount a single 7.87 in (200 mm) diameter sample, up to 3 mm thick, with maximum AOI 65°
	– Universal sample holder: Accommodates mounting of irregular-shaped samples of up to 10 mm thickness, within the 8-inch diameter mounting space. The universal sample holder has 24 × 1-inch holes, evenly spaced around the 8-inch diameter ring, allowing %R and %T measurements to be made through any of the 24 holes.
	Physical sample size
	Maximum:
	– 1-inch round sample holder: 25.4 mm (1 in) diameter, 10 mm thickness
	– Wafer holder: 200 mm (8 in) diameter, 3 mm thickness
	– Universal sample holder: 200 mm (8 in) diameter, 10 mm thickness

VW Absolute Specular Reflectance Accessory (SRA)  **Learn More** – VW Absolute SRA flyer – VW Absolute SRA product page	Designed to measure near-normal (7° AOI), mirror-like specular reflectance off sample surfaces such as high-reflectance mirrors or gloss paints. It can be used to determine the degree of polishing of an optical surface, or to measure the film thickness of thin coatings. The accessory is installed in the sample compartment, with optical elements mounted on a moveable platform which can be quickly interchanged, enabling easy configuration. Samples can be placed in both beams, allowing comparative measurements. Configurable in a dual bounce "W" or single bounce "V" (known-mirror) configuration. The accessory follows Strong's method, using one mirror on a moveable three-pin mount for both calibration and sample reflectance. This absolute reflectance technique combines a maximum light throughput accessory with the high-dynamic range of the Cary 4/5/6i/7000 spectrophotometers to measure samples with very low reflectance such as anti-reflection coatings or low antireflection mirrors. **Specifications** – Wavelength range: 175–900 nm (Cary 4000), 175–3,300 nm (Cary 5/7000), 175–1,800 nm (Cary 6000i) – AOI: 7° – Minimum sample size: 25 mm diameter for two reflections, 12 mm diameter for single reflection – Maximum sample size: Limited only by the height and width of the sample compartment – Max sample thickness: 35 mm **Physical sample size** – Maximum: 80 × 80 mm – Minimum (square shape): 20 × 30 mm – Minimum (circular shape): 25.4 mm (1 in)
Variable Angle SRA (VASRA)  **Learn More** – VASRA product page – VASRA flyer	A relative %R accessory; measure reflectance at incidence angles between 20˚ and 70˚ degrees, to the nearest degree. The VASRA features a sample translation mechanism that ensures the same part of the sample is illuminated at different angles enabling measurements at different angles to be more effectively compared. The VASRA can only be used with the manual (crystal) Glan-Taylor polarizer. It is suited for measuring the refractive index of lens coatings, anti-reflective coatings on glass, coated filters, and mirrors, and other reflectance measurements of materials at various angles and wavelengths. The VASRA requires an extended sample compartment accessory for use with the Cary 4/5/6i/7000 spectrophotometers. **Specifications** – Wavelength range: 175–900 nm (Cary 4000), 175–3300 nm (Cary 5/7000), 175–1800 nm (Cary 6000i) – Polymer film polarizer: 400–700 nm – Glan-Taylor polarizer: 350–2,300 nm – Maximum vertical ray divergence: ± 2.2° (maximum horizontal beam divergence: ± 2.5°) – AOI: 20–70° **Physical sample size** Maximum: – Angle 20°: 150 mm length, 140 mm height, 65 mm thickness – Angle 45°: 235 mm length, 140 mm height, 53 mm thickness – Angle 70°: 243 mm length, 140 mm height, 35 mm thickness

Solid - Specular

Fixed Angle SRA



The SRA allows relative specular reflectance measurements to be made at a fixed AOI, depending on the accessory.

Floor-Mounted

- Fixed angles of 8°, 12.5°, 22.5°, 30°, 45°, and 60°
- Ideal for determining optical properties such as refractive index, thickness, and coating performance.

Slide-Mounted

- Fixed angles of 30°, 45°, and 60°
- Particularly useful for studies of film thickness on metallic substrates and measurements of epitaxial film thickness.
- Using slide-mounted requires use of solid sample holder.

If using additional accessories with the SRA, such as a polarizer, then a slide-mounted SRA may be more suitable.

Use a single SRA in the sample beam with RBA for low reflectance samples, or two SRAs – one in sample beam, one in reference beam if desired.

Measurements are relative; measurements can be referenced to a certified mirror (optional).

Specifications

- Beam geometry ensures minimal variation and high reproducibility, providing consistent results
- Horizontal sampling surface for stability during measurements
- Simple alignment using alignment mirror (included), making setup quick and straightforward
- Three interchangeable masks (3, 6, and 13 mm diameters) are supplied as standard for examining small samples or small areas of large samples

Physical sample size

- Maximum: 140 × 140 mm, thickness 50 mm
- Minimum: 25 mm diameter (without use of apertures)

Learn More

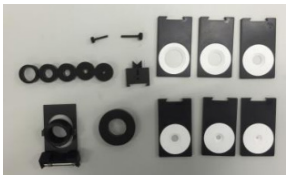
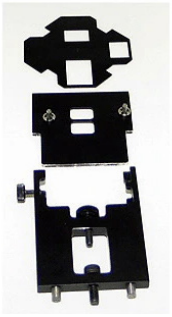
- Slide-mounted SRA product page
- Floor-mounted SRA product page

Quick-reference table for SRAs

Specular reflectance is generated by a smooth surface. The light ray's AOI is equal to the angle of reflection. Specular materials therefore produce a mirror-like image on their surface. Measure specular reflectance using SRAs.

	Fixed Angle SRA	VASRA	VW Absolute SRA	UMA
Angle of Incidence	Fixed angles of 8°, 12.5°, and 22.5° (floor-mounted only), 30°, 45°, and 60° (floor-mounted or slide-mounted)	Variable (20–70°), to nearest degree	Near-normal, 7°	Variable (5–85°), user-definable
Measurement Modes	Relative specular reflectance	Relative specular reflectance	Absolute specular reflectance	Absolute specular reflectance, transmittance, absorbance, scattering
Measurement Type	Relative %R: requires certified reference mirror to correct reflection values to absolute %R	Relative %R.	Absolute %R	Absolute %R, %T, absorbance, scattering
Sample Size Range	Maximum 140 × 140 mm Minimum 25 mm diameter without use of apertures; 3, 6, and 13 mm diameter interchangeable masks supplied	Maximum at angle 20°: 150 mm length, 140 mm height, 65 mm thickness Maximum at angle 70°: 243 mm length, 140 mm height, 35 mm thickness	Maximum limited by compartment Minimum 25 mm diameter for two reflections and 12 mm diameter for single reflection	Various holders support small to large samples. Maximum physical sample sizes: – 275 mm if round diameter – 255 mm if detector slide mount has been installed – 235 mm if a depolarizer is mounted in the detector slide mount Minimum limited by choice of beam size
Key Features	Simple setup, consistent and precise AOI	Adjustable range providing more flexibility	Single and dual sample bounce modes, absolute %R	Independent rotation of sample/detector, polarization, multi-modal, fully automated and unattended collects
Ideal for	Routine measurements. Flat solids, coating performance, thin films	Angular-dependent optical properties, film thickness and refractive indices	Augmented reality (AR) mirror gloss, low %R surfaces	Solids, fragile samples, irregular shapes–flexible geometry needs

Solid - Diffuse	
Diffuse Reflectance Accessory (DRA) Learn More – UV-Vis-NIR DRA flyer	Integrating spheres are ideal for transmission measurements of scattering samples, such as turbid, translucent, or opaque refractory materials. These samples distort the instrument's beam, or deviate light away from the detector's optical path, resulting in compromised measurements with conventional setups. The DRA, which includes an integrating sphere, efficiently collects a high proportion of diffusely reflected radiation, providing more accurate results. Specular reflectance can be removed, providing a choice of either diffuse-only or total-reflectance modes. The DRA can also be used for transmittance measurements. To accommodate different sample types and sizes, the DRA can be fitted with a liquid or powder cell holder. The DRA features an in-built high-performance photomultiplier tube (PMT). Depending on the DRA and application, it also has a thermoelectrically cooled lead sulfide (PbS) or high-sensitivity narrow band indium-gallium-arsenic (InGaAs) detector.
Internal DRA Learn More – Internal DRA product page	An internal 110 mm integrating sphere for measuring diffused reflected radiation from scattering materials (for example, powders, rough surfaces) – optimal for non-specular (matte-like) surfaces. It fits completely inside the instrument sample compartment. Choose the internal DRA for quick sampling and handling. Its compact size and deployable design enable rapid switching, while minimal alignment requirements help reduce setup time. **Physical sample size** – Maximum %R: Circular 100 mm diameter, square 100 × 100 mm, thickness 30 mm – Minimum %R: 18 mm diameter – Maximum %T: 180 × 80 mm, thickness 40 mm
External DRA Learn More – External DRA product page	An external 150 mm integrating sphere for reflectance measurements of scattered light from large or irregularly shaped samples. The External DRA mounts in the instrument sample compartment but extends beyond the instrument footprint. Choose the external DRA with optional accessories to measure a broader range of sample types than is possible with an internal DRA. **Physical sample size** – Maximum %R: 140 × 80 mm, thickness 25 mm – Minimum %R: 40 mm diameter (without use of apertures) – Maximum %T: 80 × 80 mm, thickness 10 mm – Maximum Abs, centre mount: port diameter 50 mm diameter
DRA Powder Cell Kit Learn more Powder cell kit product page	The powder cell is used to hold powder or paste samples against the reflectance port of the internal or external DRA. The powder cell fits inside the reflectance sample holder to deliver better diffuse reflectance spectra when a sample is ground to powder form. The kit contains a prepacked PTFE cell (reflectance standard) and an empty cell holder with a filling funnel for sample measurements. The cell holder accommodates a range of sample volumes. **Physical sample size** – Minimum practical volume: 0.2 mL internal DRA, 2 mL external DRA – Maximum volume: 1 mL internal DRA, 20 mL external DRA **Internal DRA powder cell** **Powder kit cell** **External DRA powder cell holder**

Solid - Diffuse	
External DRA Small Spot Kit 	Use the kit to reduce the sample beam size at the transmission port, reflectance port, or sphere center of the external DRA. A focused small beam spot enables minimal light loss, providing a better signal-to-noise ratio to measure small samples, while maintaining measurement accuracy. The focused beam can also be used to measure a small portion of a larger sample. Or use with a center-mount sample holder to prevent the sample beam from overfilling the sample at high measurement angles. **Specifications** – Consists of iris and mirror assembly, and three lens options (with holder) – Beam size: ~3 mm diameter at transmission position, 3.5 × 1.5 mm at reflectance position **Physical sample size** **Minimum:** 5 mm
External DRA Aperture Kit 	The aperture kit contains apertures to reduce the diameter of the reflectance port, for examining small samples at the reflection port. The kit contains 6 apertures (3.8 mm, 6.4 mm, 9.5 mm, 12.7 mm, 19.1 mm and 25.4 mm), 5 small spacers and 1 large spacer.
External DRA Double Aperture Kit  Learn more – Double aperture attachment product page – Measuring photometric accuracy using double aperture method	The double aperture accessory is used with the Agilent Cary WinUV Validate software to test the %T photometric accuracy of the DRA by the double aperture technique in the UV-Vis (PMT) and NIR (PbS or InGaAs) spectral range. The double aperture attachment attaches to a slide mount, which then mounts in the external DRA.

Solid - Diffuse

External DRA Sample Holders

Learn More

- Cuvette-style holder product page
- Jaw-style holder product page
- Clip-style holder product page

Holders for transmission

Variable angle transmission holder
Allows transmittance measurements of solid samples at various incident angles. The sample can be positioned through 360-degrees to the incident beam (to nearest degree).

External mount for cuvette holder

Cuvette holder

(External mount) cuvette holder
Mounts a standard 10 mm cuvette directly into the clip-style (in front of the) transmission port. Record transmission data using the comparison method described in the WinUV UV Accessories help.

Center-mount holders

Offer the ability to:

- Vary the AOI for reflectance and transmission measurements
- Measure transmission and reflectance of a sample together (transflectance)

Types of center-mount holders include:

Variable angle holders
The holders mount a solid sample at the center of the sphere at a specified AOI from the sample beam, using a 360° rotating dial (to nearest degree), allowing measurements at beam incidence angles ranging from 0 to 60°.

Variable angle holders include:

Clip-style

- A spring-loaded clip to hold the sample
- Suitable for thin, flexible samples
- Useful for transflectance measurements
- The sample must be in a sheet configuration and large enough to accommodate entire sample beam

Jaw-style

- Used to clamp larger, rigid, bulkier samples (up to 1.5 in or 38.1 mm length and width) into place
- Width limitation depends on the thickness of sample and maximum AOI the application requires
- Designed for reflectance measurements that do not transmit light
- Sample must be opaque, or an absorbent backing must be applied

Cuvette holders

- Positions a 10 mm path length cuvette inside the sphere at a fixed angle normal (fixed at 0° AOI) to the sample beam
- Enables measurements that include the scattered component of transmitted radiation. Allows the simultaneous measurement of a turbid sample diffuse transmission and reflectance, so that absorbance can be derived in one easy measurement.
- Ideal for measuring turbid liquid samples (for example, seawater, proteins, and other biological solutions)

Solid - Diffuse

Quick-reference table for external DRA sample holders

Transmission-Port	Variable angle transmission holder		Suitable for rigid samples such as mirrors and glasses.
	Cuvette Holder		– Mounts standard 10 mm cuvette directly into clip-style (in front of the) transmission port – Used for measuring the transmission of a liquid sample
Center-Mount	Variable angle holders	Clip-style	– A spring-loaded clip to hold sample – Ideal for thin, flexible samples (sheet configuration). Useful for transflectance measurements.
		Jaw-style	– Clamps larger, rigid, bulkier samples (< 1.5 inch length and width) into place – Designed for reflectance measurements that do not transmit light (sample must be opaque)
	Cuvette holder		– Positions 10 mm cuvette inside the sphere at a fixed angle normal to beam – Ideal for measuring turbid liquid samples that would scatter

Praying Mantis DRA

Learn More

– Praying Mantis DRA product page

Designed for high-sensitivity diffuse reflectance measurements of solid, powdered, or highly scattering materials. Unlike standard DRAs, the Praying Mantis DRA incorporates mirrored collection optics, rather than PTFE integrating spheres, to collect diffusely reflected light while minimizing specular reflection. The use of reflective mirrors ensures the accessory itself does not impose limits on the wavelength range of the system in which it is installed.

Specifications

– Accessible wavelength range: equal to host instrument, for example, 175 to 3,300 nm for the Cary 5000
– Requires a reference material that is of similar reflectivity and similar property to the sample
– Supplied with a mirror to be used as a reference to establish a baseline
– Supplied with two different sized sample cups and a funnel to aid with sample filling

Small image (3 mm diameter) makes Praying Mantis ideal for small-sized, highly scattering, low-volume and in-situ analysis applications of solids, powders, pastes, liquids, or samples that must be kept horizontal. The small sample requirement enables researchers to conserve valuable samples.

Tailor your analysis further using optional accessories (Specac Ltd., Orpington, UK):

– Low temperature reaction chamber for pressure and temperature operation down to –150 °C (under vacuum)
– High temperature reaction chamber for pressure and temperature operation up to 910 °C (using Electronic Powered Control box, PCB 1500 for water cooling/circulation, cables)
– Vacuum chamber for both accessories: 133 mPa (10^{-6} Torr) to 133 kPa (1 kTorr).
– Mesh filters (available in attenuator kit) for rear beam attenuation at ~830 nm and < 200 nm

Physical sample size

– Micro sample cup: 0.03 mL (30 µL)
– Standard sample cup: 0.25 mL (250 µL)

Quick-reference table for DRAs

Diffuse reflectance is generated by a rough surface. The light ray's incidence angle generates multiple reflection angles. Diffuse reflectors therefore have a matte-like surface. Measure diffuse reflection using DRAs.

	Internal DRA	External DRA	Praying Mantis DRA
Sphere Size	110 mm sphere	150 mm sphere	N/A
Mounting	Fits completely inside instrument	Mounts in instrument sample compartment but extends beyond instrument footprint	Mounts inside the extended instrument sample compartment (sold separately)
Wavelength Range	Wavelength range (nm) of each detector in the respective UV-Vis-NIR spectrophotometers **DRA-900 / DRA-2500 / DRA-1800 / Praying Mantis** Cary 4000: 200–900 / 200–900* / 200–900* / 175–900 Cary 5000: 200–900 / 200–2,500 / 200–1,800 / 175–3,300 Cary 6000i: 200–900 / 200–1,800* / 200–1,800 / 175–1,800 Cary 7000: 200–900 / 200–2,500 / 200–1,800 / 175–3,300 * Indicates full wavelength capability of the DRA is limited by the spectrophotometer itself. On this basis, the configuration is not recommended. However, the configuration is still supported.		
Polarizer	**Manual polarizer:** wire grid or crystal (Glan Taylor)	**Manual polarizer:** crystal (Glan Taylor)	**Manual polarizer:** N/A
Key Features	– Easily deployable, in comparison to external – Small efficient size resulting in high signal-to-noise and greater dynamic range	– Greater measurement type flexibility than internal – Center mounting options for simultaneous measurement of reflectance and transmittance – Variable angle measurements for center and transmission positions	Highly scattering samples that require precision
Ideal for	Routine and quick sampling	– Ideal for large and physically challenging samples – for example, coarse or highly granular powders – Highly scattering kinetic studies	Low-volume powder samples requiring conservation

Quick-reference comparison guide for solid accessories

A selection guide based on sample type and measurement mode.

	Sample Type				
Sample Measurement	**Smooth/Flat**	**Irregular/Rough**	**Powder/Gel/Paste**	**Organics/Textiles**	**Bespoke**
%T	Solid Sample Holder	Internal DRA	Internal DRA	Internal/External DRA	– Fiber Optics (%T Probe) – External DRA
%T (High AOI)	– External DRA – Variable Angle Transmission Holder	– External DRA – Variable Angle Transmission Holder	UMA	External DRA	Fiber Optics (%T Probe)
Diffuse %T	– Internal/External DRA – UMA	– Internal/External DRA – UMA	– Internal DRA – UMA	Internal/External DRA	Fiber Optics (%T Probe)
Specular %R (Low AOI)	– Fixed Angle SRA – VW Absolute SRA	– Fixed Angle SRA – VW Absolute SRA	– Fiber Optics (%R Probe) – Internal DRA	UMA	– Fiber Optics (%R Probe) – External DRA
Specular %R (High/Wide AOI)	UMA	UMA	– Fiber Optics (%R Probe) – Internal DRA	UMA	Fiber Optics (%R Probe)
Diffuse %R	– Internal/External DRA – UMA	– Internal/External DRA – UMA	– Praying Mantis DRA – Small DRA	– Internal/External DRA – UMA	– Fiber Optics (%R Probe) – External DRA

Liquid	
Cell Holders	The Cary UV-Vis liquid cell holders hold cuvettes designed for analyzing the absorption of UV-Vis-NIR light by a liquid solution to determine its chemical properties and concentration. The cell holder mounts onto the cell holder base supplied with the spectrophotometer. There are a range of shapes and path lengths. Holders can also be ambient, or temperature-controlled operated by the WinUV software. Add the Cary temperature probe to monitor sample temperature. When measuring liquid samples, consider the path length of the cuvette, absorbance properties of the solvent, and the concentration range of the sample.
1 × 1 Single Cell Holder (Ambient) Learn More – Cell holders product page	– Standard rectangular cell holder: Holds standard 10 mm cell (3.5 mL volume). Two are supplied as standard. A cell lifter aids insertion and removal of cuvettes. – Long path length rectangular cell holder: Accommodates rectangular cells of 20, 50, and 100 mm, and rectangular flow cells – Variable path length cell holder (p/n: 210125300): Holds rectangular cells of 5, 10, 20, 30, 40, and 50 mm path lengths and mounts in the slide mount of the standard solid sample holder – Variable path length cell holder (p/n: 6610014000): Holds rectangular cells of up to 100 mm path length – Cylindrical cell holder: Holds cylindrical cells of up to 100 mm path length **Standard cell holder** **Long path length rectangular cell holder** **Variable path length cell holder (for cells up to 100 mm path length)** **Cylindrical cell holder**
1 × 1 Peltier Cell Holder (Temperature-controlled) 1x1 Peltier Controller 1x1 Peltier Cuvette Holder Learn More – Cell holders product page – 1 × 1 Peltier Cell Holder product page	The Peltier cell holder allows temperature-controlled measurements for a single sample and reference cell, using standard 10 mm path length cuvettes with a height of 45 mm. The rectangular cell holder is mounted onto the standard cell holder base supplied with the spectrophotometer. – The temperature of each holder can be independently regulated or used at a single temperature. – For stable, static temperature control between 0 and 100 °C, an external water circulating system is required (extended sample compartment and external water bath). Temperature range 0 to 100 °C

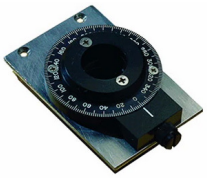
Liquid	
6 × 6 Multicell Cell Holder (Ambient) 	The ambient multicell cell holder consists of two sets of six staggered cell holders, allowing up to six sample cells and six reference cells to be measured in Double Beam mode. Includes extended sample compartment.
6 × 6 Multicell Cell Holder (Water-thermostatted) **Learn More** – Multicell Holder product page	The water-thermostatted multicell holder provides temperature control for the two sets of six staggered cell holders. Includes temperature probe. Water thermostatting is useful for medium-range static temperature applications. The performance characteristics depend on the specifications of the water bath that is used. The following performance characteristics can be achieved with the use of the PCB1500 Water Re-Circulator accessory. **Temperature range** – Ambient to 60 °C with accuracy of ± 0.1 °C – Temperature reproducibility: ± 0.05 °C
6 × 6 Multicell Cell Holder (Peltier-thermostatted) **Learn More** – Multicell Holder product page	The Peltier-thermostatted multicell holder provides greater temperature control for the two sets of six staggered cell holders, with incremental ramping enabled. Peltier technology provides faster temperature stabilization and better precision compared to water-thermostatted temperature control systems. Includes temperature probe and built-in stirring functionality. This multicell holder is ideal for users wanting to quickly and incrementally configure or ramp temperature during an experiment. **Temperature range** – –10 to 100 °C with accuracy of < 0.3 °C at 37 °C – Temperature ramp rate 0.06 to 30 °C/min **Physical sample size** **Minimum cuvette volume:** 80 µL

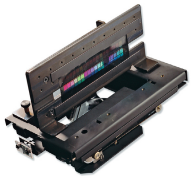
Liquid	
PCB1500 Water Re-Circulator **Learn More** – PCB1500 product page	A water-thermostatting device for static temperature control. Designed to provide precise temperature control at a stable temperature during analysis, which is crucial for obtaining accurate and reproducible results. The circulating water bath enables efficient maintenance of cells at a specified temperature using a constant flow of water to the accessory from the water bath. **Temperature range** – Ambient to 60 °C with accuracy of ± 0.1 °C – Temperature reproducibility: ± 0.05 °C – Purging is recommended at temperatures below the dew point to prevent condensation on the cuvette face
Temperature Controller (Peltier-thermostatted) 	A Peltier thermostatting device for temperature ramping studies. An electrothermal device that heats and cools samples by controlling heat exchange devices positioned around the sample. It uses a built-in coolant reservoir to act as a heat transfer device to prevent the sample compartment from reaching high temperatures. The Temperature Controller offers a wide temperature range and accurate control of sample temperature for temperature ramping with speed-controlled magnetic stirring. **Temperature range** – –10 to 100 °C with accuracy of < 0.3 °C at 37 °C – Temperature ramp rate 0.06 to 30 °C/min – Purging is recommended at temperatures below the dew point to prevent condensation on the cuvette face **Physical sample size** **Minimum cuvette volume:** 80 µL

Quick-reference comparison guide for liquids

A selection guide based on sample type and measurement conditions.

Samples	Measurement Conditions	Accessories
Transparent	Standard – measure samples using a standard cell with an optical path length of 10 mm	Standard rectangular holder.
	Samples with lower concentration or lower absorbance, or to extend the limit of detection for analyte of interest	Long or variable path length holder.
	For measuring high-concentration or very low volume samples	– Semi-microcell (40% vol of standard), OR – Microcell (20% vol of standard), OR – Ultra-microcell (µL)
Suspension	For measuring liquid samples with particles (for example, protein)	– External DRA – Center-mount cuvette holder
Thermostatted	Mid-range temperature-static, water-thermostatted experiments	– Peltier cell holder – PCB1500 water-thermostatted accessory – Temperature probe
	Temperature-controlled Pelter-thermostatted experiments. Improved temperature range and temperature stabilization with incremental ramping.	– Peltier cell holder – Peltier-thermostatted temperature controller – Temperature probe
Remote	Remote sampling	Fiber optic coupler with dip probes

Miscellaneous - Solid	
Polarizers (and Depolarizers) Learn More Polarizer/Depolarizer data sheet	Polarizers are used to control the plane polarization of the incident light beam in a spectrophotometer. Instrument optics partially polarize the light by the time it reaches the sample. Depolarizers are used to convert any plane polarization of the incident light beam to a non-uniform mixture of polarizations. For use with solid sample holders (required) or DRAs (optional).
Manual Wire Grid Polarizer/Crystal Depolarizer Learn More – Polarizer/Depolarizer product page	This wire grid-type polarizer is mounted in a slide with dial. It is manually operated, allowing users to physically adjust the polarization angle of light passing through the sample. A straightforward solution for laboratories with limited budgets, and suitable for applications where polarization angles do not require frequent adjustments. Specifications **Wavelength range:** 250 to 2,500 nm The depolarizer element is a crystal wedge of synthetic quartz, compensator wedge of fused silica Suprasil, with approximate clear diameter 15 mm. Spectral range approximately 180 nm to 2.5 µm. The depolarizer can be rotated 360° and locked into any position to optimize depolarization efficiency. Polarizers (8 and 18 mm) and Depolarizer Mounted 8 mm Polarizer Mounted 18 mm Polarizer Mounted Depolarizer
Auto Wire Grid Polarizer 	The auto polarizer is software-controlled, automatically adjusting between vertical and horizontal polarization positions without manual intervention. The polarizer is a nano-wire grid that is lithographically laid onto a highly transmissive quartz substrate, providing exceptional polarization quality (extinction ratio) over a broad wavelength range. The wire grid arrangement has a wide acceptance angle (± 20°) ensuring the full beam power can be polarized, improving throughput and leading to better system sensitivity. Use as a standalone accessory with the large polarising element (18 × 18 mm clear aperture) or with the UMA with the small (8 × 8 mm) polarising element. For high-throughput environments or studies necessitating frequent and precise polarization changes, the automated polarizer provides significant advantages in efficiency and consistency. Improves reproducibility and accuracy in experiments requiring frequent or precise polarization changes. Specifications – **Wavelength range:** 250 to 2,500 nm – Rotation angle settable to 0.2 degrees
Manual (Crystal) Glan-Thompson Polarizer Learn More – Glan-Thompson product page – Glan-Thompson data sheet	The manual Glan-Thompson polarizer is made of two calcite elements cemented together to form a prism. This configuration reduces its power-handling capability but results in an increased field of view. The polarizer can safely handle up to 2 W of continuous optical power (< 2W continuous wave (cw)). Therefore, it is recommended for low-to-medium power applications requiring a large field of view and the highest degree of polarization purity. The Glan-Taylor polarizing prism is mounted in a stainless-steel slide, with vernier and dial, at the side or center of the solid sample holder. Specifications – **Wavelength range:** 350 to 2,300 nm – **Thickness:** 4.5 cm
Manual (Crystal) Glan-Taylor Polarizer  Learn More – Glan-Taylor data sheet – Glan-Taylor product page – Glan-Taylor flyer	The manual Glan-Taylor polarizer is made of two calcite prisms assembled with an air-spaced design. Its thin profile makes it ideal for applications in which there are space constraints. The Glan-Taylor polarizing prism is mounted in a stainless steel slide, with vernier and dial, at the side or center of the solid sample holder. Specifications – **Wavelength range:** 350 to 2,300 nm – **Thickness:** 1 cm

Miscellaneous - Solid	
Manual Rear Beam Attenuator 	Rear beam attenuation (RBA) provides coarse adjustment of the system's reference beam intensity to extend the spectrophotometer's dynamic range and reduce noise at higher absorption levels. Ideal for samples with high optical density or very low transmittance, or to compensate for accessories that reduce the sample beam intensity. The manual RBA can be used to attenuate the reference (rear) beam from 0.5 to 3.1 AU. With additional neutral density mesh filters, attenuation to 4.5 AU is possible. The mesh screen can be taped to the reference window, providing easy use. The manual RBA level used is typically half that of the sample's maximum absorbance, and so comfortably covers the critical absorbance range of 1 to 9 AU.
Automated Rear Beam Attenuator Learn More Rear Beam Attenuator product page	The automated RBA attenuates the rear beam from 0 to ~1.7 AU. The stepper-motorized accessory mounts on the sample compartment wall and is driven from the Cary WinUV software. It can be set to provide a nominated level of attenuation, a nominated photometric value, or a nominated angle.
Accessory Lock Down Plate 	Cary 4/5/6i/7000 instruments feature the unique Lock-Down mechanism on plates that enable the user to quickly and reproducibly position accessories in the instrument. The user can confidently and securely mount any accessory in the sample compartment in exactly the same place, ensuring: – Consistent positioning – Efficiency: eliminates tools and time-consuming alignment processes – Accuracy: mitigates user-sourced errors in measurement Beneficial in applications requiring high precision in measurements and routine testing where consistent and reliable results are necessary. Spares can be ordered.
Sample Transport and Film Holder  Learn More – Film Holder product page – Film Holder Accessory flyer	The sample transport accessory is a moveable platform that can be used to position samples in the sample compartment. The platform can move up to 160 mm (with positional accuracy ± 0.2 mm) away from its home position, allowing photometric measurements at different positions along a sample or multiple samples to be sequentially analyzed. Plug the accessory into the back of the sample compartment to control it via the Cary WinUV software. This accessory requires an extended sample compartment. Film holders are versatile accessories used in conjunction with the sample transport accessory. The film holder accessory provides vertical mounting capabilities for films, gels, sheets of material, or multiple filters. By moving the platform through the sample beam, the user can plot photometric mode versus position (mm). The film holder is equipped with a number of mounting holes (to provide sample size flexibility) and included mylar strips (to protect delicate samples from scratching). The extended sample compartment accessory is required (sold separately).

Fiber Optic Coupler and Probes

Fiber optic probe

Fiber optic coupler

Learn More

- Fiber Optic Probes product page
- Fiber Optic Coupler instruction sheet

Fiber optics enable fast and accurate measurements of remote and in-situ samples, improving workflow and productivity, and eliminating the need for cuvettes. A range of fiber-optic probes, couplers, extendable light shields, and fixed/removeable tips are available to use with Cary UV-Vis-NIR spectrophotometers.

Each fiber-optic probe uses the widely used SubMiniature version A (SMA) connector, and is supplied in a hard carry case with a product test certificate, probe compatibility matrix, routine maintenance and cleaning guide, troubleshooting guide, and probe health verification guide.

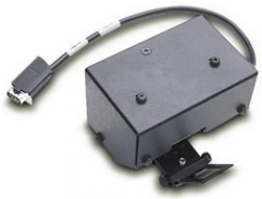
The UV-Vis-NIR fiber-optic coupler (FiberMate2 accessory) for Cary 4/5/6000i includes extendable light shields which interface with the sample compartment windows.

Sample compartment doors may remain open during operation.

Fiber Optics

Quick-reference table for probes

Sample	Dip Probe	Conditions
Liquid	Stainless-Steel Probe	Best choice for general use, but not recommended for acidic samples; 3 m long, 10 mm path length
	Torlon Plastic Probe	Chemically resistant, ideal for measurements where chemical resistance is important or non-metallic probes are essential. Suitable for operation in temperatures up to 85 °C.
	Quartz Probe	Best chemical resistance, ideal for corrosive samples or measurements at high temperatures (suitable for use up to 150 °C).
Surface/Solid	%R Probe	For total reflectance measurements **Specifications:** – Illumination area: 1 mm – Outer diameter: 6.3 mm – Probe material: stainless steel, with fixed tip – Length: 76 mm
	%T Probe	For total transmittance measurements **Specifications:** – For thin samples < 5 mm – U-shaped holder for fiber-optic probe heads is supplied
	Stainless-Steel Absorption Probe	For absorption measurements **Specifications:** – 3 m long fiber – 10 mm path length – Replaceable tip – Includes light shield
	Hellma Quartz Probe	For absorption measurements

Test Equipment	
Auto (and Manual) Double Aperture Accuracy Kit Manual double aperture kit  Automated double aperture kit Learn More – Manual Double Aperture Kit product page – Automated Double Aperture Kit product page – Double Aperature instruction sheet – Measuring photometric accuracy using the double aperture method	A tool for system verification. The double aperture accessory uses the double aperture method (used by national standards labs) to determine the absolute (%T) photometric accuracy of your Cary 4/5/6i/7000 spectrophotometer, without limits on temperature, wavelength, or spectral bandwidth (SBW). The double aperture method can detect significant nonlinearity in photometric measurements, which is crucial for ensuring accurate results. **Manual Operation** Enables manual control - the user can sequentially rotate the aperture plate through its four positions. **Automated** Adjustments to aperture plate made automatically by the WinUV software – can be left to operate unattended, no operator intervention required. The accessory mounts directly in the sample beam path on the baseplate. Components accompanying the double aperture accessory include base mount, aperture plate, masking wheel, and assorted fasteners.
Linearity Neutral Density Kit Learn More – White paper – Optical densities technical overview – Linearity Kit instruction sheet	A system verification tool. The kit evaluates photometric linearity (i.e., how accurately the instrument measures absorbance with increasing concentration). The addition-of-filter technique is used to determine instrument linearity within the relevant working absorbance range. Poor photometric linearity will produce incorrect results, so routine checks are recommended. The test requires two calibrated neutral density filters each of 0.3, 0.5, 1.0, and 1.5 Abs. They are easy to handle, although they need to be kept clean (using a soft cloth) and scratch-free. A software method is provided in the Agilent Cary WinUV Validate application as standard. The Validate test for Linearity will determine whether the instrument has failed/passed the tests at specified wavelengths, according to inputted Abs tolerances. Alternatively, manual operation can be done. The test requires simple calculations based on the measured absorbances values of filters. The resulting data points are plotted on a graph, which is then interpreted to evaluate photometric linearity. The linear neutral density kit includes neutral density filters and dual filter holder.

For more information

Application examples, use-cases and more

The Basics of UV-Vis-NIR Spectrophotometry primer

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General information on UV-Vis-NIR

- UV-VIS-NIR spectrophotometers
- Spectroscopy supplies
- Cary WinUV Software for UV-Vis-NIR applications

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DE-010520

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Printed in the USA, August 10, 2026
5994-8626EN

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