

# Agilent Cary UV-Vis-NIR Spectrophotometer

## 1. Agilent Cary UV-Vis-NIR Spectrophotometer

**Function:** This is a high-performance spectrophotometer designed for measuring the absorbance, transmission, and reflection of samples across a broad spectral range, encompassing ultraviolet (UV), visible (Vis), and near-infrared (NIR) light, typically from 175 to 3300 nm.

**Applications:** It's widely used in materials science, life sciences, and other research areas for applications like thin film analysis, optical property measurements, and nanomaterial research.

**Key Features:** It boasts superior photometric performance, a wide dynamic range, and the ability to measure beyond 8.0 absorbance units, especially with reference beam attenuation. The modular Cary WinUV software provides control and analysis capabilities.

## 2. Newport RS 2000 Optical Table

**Function:** The RS 2000 is a research-grade optical table known for its exceptional vibration immunity and stability, crucial for sensitive optical experiments like those conducted with a UV-Vis-NIR spectrophotometer.

**Design & Damping:** It features a constrained layer core, a damped working surface, and a composite edge finish for broadband damping. Crucially, it incorporates two precision-tuned dampers to eliminate fundamental structural table modes and their harmonics, a technique called Tuned Mass Damping (TMD).

**Features:** Other features include a super-rigid trussed honeycomb core, vertically bonded triple core interfaces for enhanced stiffness, individually sealed mounting holes for cleanliness and integrity, and highly damped side panels to minimize external vibrations.

## How to Use?

**Sample Preparation:** Place the sample in a cuvette (a small transparent container).

**Loading:** Insert the cuvette into the sample holder inside the spectrophotometer.

**Setup:** Use the connected computer to configure the scan parameters (e.g., wavelength range).

**Measurement:** The instrument shines light through the sample and measures absorbance or transmittance at each wavelength.

**Analysis:** The software displays a spectrum, which can be analyzed to determine properties like concentration, purity, or molecular structure.

## How to Set-Up and Perform a Scan

### 1. Power On and Launch Software

- Turn on the spectrophotometer and the connected computer.
- Launch the **Cary WinUV software** (or the appropriate control software).

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### 2. Select Scan Mode

- In the software, choose **Scan** or **Spectrum Mode** depending on your analysis needs.
  - You can also choose **Absorbance**, **Transmittance**, or **Reflectance** depending on what you're measuring.
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### 3. Configure Scan Parameters

Set the following:

- **Wavelength Range:** e.g., 200–800 nm for UV-Vis, or up to 3300 nm for NIR.
  - **Data Interval:** e.g., 1 nm steps.
  - **Scan Rate:** e.g., medium or fast depending on sample stability.
  - **Baseline Correction:** usually done with a blank cuvette.
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### 4. Prepare and Load Sample

- Fill a **quartz cuvette** with your sample.
  - Clean the cuvette to avoid contamination or scattering.
  - Place it in the **sample holder** inside the spectrophotometer.
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### 5. Run Blank Scan

- Insert a cuvette with solvent or blank solution.
  - Run a **baseline scan** to zero out background absorbance.
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### 6. Run Sample Scan

- Replace the blank with your sample.
  - Click **Start Scan** in the software.
  - The system will record absorbance/transmittance across the selected wavelength range.
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## 7. Analyze Results

- View the spectrum graph.
- Use software tools to:
  - Identify peaks.
  - Calculate concentration (using Beer-Lambert Law).
  - Export data for further analysis.