



VARIABLE ANGLE REFLECTION ACCESSORY

Harrick's Variable Angle Accessory is ideal for specular reflection studies of films on metallic substrates, coatings, contaminants on reflective surfaces, and measurements of film thickness. The sample stage is readily adapted for absolute reflectance measurements or convenient horizontal sampling at a 12° incident angle.

APPLICATIONS

- ▶ Specular reflection studies of coatings on reflective substrates.
- ▶ Films on metallic substrates.
- ▶ Determining film thickness.
- ▶ The industry standard for variable angle specular reflectance.

FEATURES

- ▶ Incident angle variable from 30° to 85°.
- ▶ Accommodates samples at least 12mm x 12mm and up to 12mm thick.
- ▶ Maintains alignment for all incident angles.
- ▶ Adaptable for variable angle, fixed angle, and absolute reflection studies.
- ▶ Models available for a wide range of FT-IR and UV-Vis spectrometers.



INCLUDES

- ▶ Optical base unit with variable angle reflectance sample stage.
- ▶ Mating hardware for the specified spectrometer.
- ▶ Optional sample stages for absolute reflectance and horizontal sampling.

OPTIONAL SAMPLE STAGES

12° ABSOLUTE REFLECTANCE SAMPLING STAGE

- Ideal for highly reflective substrates.
- Utilizes the VW double reflection technique.
- Alignment, pathlength and polarization are maintained for both the sample and reference measurements



45° ABSOLUTE REFLECTANCE SAMPLING STAGE

- Useful for examining highly reflective substrates.
- Measures the square of the reflectance using the VW double reflection technique.
- Alignment, pathlength and polarization are maintained for both sample and reference measurements.

HORIZONTAL REFLECTION STAGE

- Fixed 12° incident angle.
- Convenient horizontal sampling.



ORDERING INFORMATION

Variable Angle Reflection Accessory.....

CATALOG NO.

VRX-XXX

'X' denotes model (C, T, L or R); 'XXX' denotes the spectrometer code

OPTIONAL SAMPLE STAGES

12° Absolute Reflectance Sampling Stage..... VR1-VWA-12

Horizontal Reflection Stage..... VR1-HRS

45° Absolute Reflectance Sampling Stage..... VRX-VWA-45

OPTIONS

Wire Grid Polarizer, KRS-5 Substrate..... PWG-U1R

Polarizer Mount (VRC models only)..... VRC-PLL

Glan-Taylor Polarizer..... PGT-S1V

Purge Cover/Light Shield (VRC models only)..... VRC-OPC

Large Sample Support..... VR1-RMA-LSS

KBr window for encl. (VRC models only)..... WPD-U38-P

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The Variable Angle Reflection Accessory is ideal for specular reflection studies of films on metallic substrates, coatings, contaminants on reflective surfaces, and measurements of film thickness. This accessory is the industry standard for variable angle specular reflectance studies. Three different models are available to suit the various optical designs of commercial FT-IR and UV-Vis spectrometers.

The incident angle can be continuously varied from approximately 30° to 80°. Samples with a minimum size of 1/2" x 1/2" and up to 0.5" thick can be readily examined. This accessory works best with samples up to 0.5" thick.

The incoming radiation is directed by mirrors to the sampling stage, where it reflects from the sample stage mirror and the sample. This mirror and the sample are coupled to rotate together. This configuration ensures that, once the Variable Angle Reflection Accessory is aligned, it remains aligned for all incident angles. A typical application is shown in Figure 1.

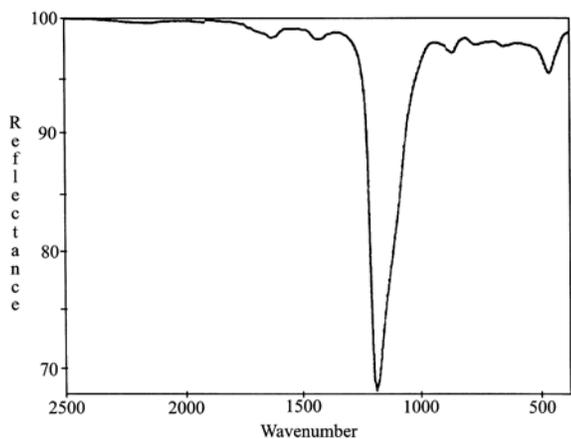


Figure 1. External Reflectance of an SiO₂ Coated Mirror at an Incident Angle of 75°.

For polarization measurements, Harrick Scientific's Brewster's Angle or Wire Grid Polarizers can be easily mounted onto the sample stage. For sampling versatility, there are four different reflectance sampling stages available: a continuously variable angle rotational stage, included with the accessory; 12° absolute reflectance stage; 45° absolute reflectance stage and a 12° horizontal stage.

Absolute Reflectance Sample Stages

The two fixed angle absolute reflectance sample stages are available, featuring incident angles of 12° and 45°. Both utilize the 'V-W' double reflection technique illustrated in Figure 2. Using this technique, the reference spectrum is obtained in the 'V' mode. The beam is directed by mirrors to the sample stage mirror and back to the detector. To collect the sample spectrum, the stage is rotated (12° model) or inverted (45° model) to the 'W' mode. In this mode, the beam is directed from the sample to the stage mirror. The sample stage mirror reflects the beam back to the sample. The beam is then directed via mirrors to the detector of the spectrometer.

This configuration maintains the alignment, optical pathlength and polarization for both the sample and the reference spectra. Note that the quantity measured is the ratio of the spectrum with the sample to the spectrum without the sample, is R^2 . Other incident angles are available on special order.

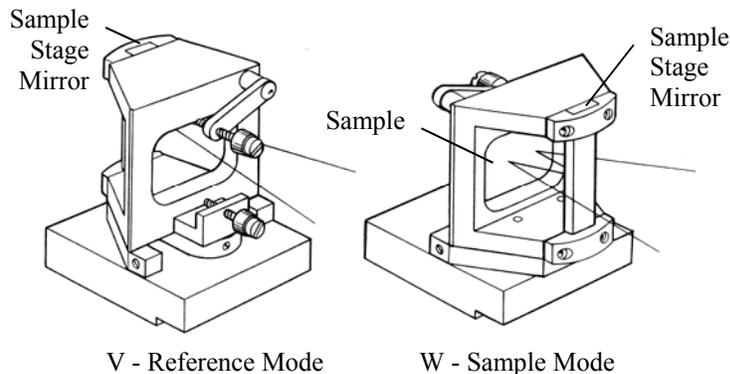


Figure 2. The 12° Absolute Reflectance Accessory.

Horizontal Reflection Stage

The Horizontal Reflection Stage (see Figure 3) is used in combination with the Variable Angle Reflection Accessory for reflectance measurements at a 12° angle of incidence (near normal). The sample rests sample side down on a horizontal stage, making surface scanning and sample exchange straightforward.

This sample stage incorporates a single mirror that reflects the radiation from the sample stage mirror to the horizontal sample and then directs the light reflected from the sample back to the sample stage mirror.

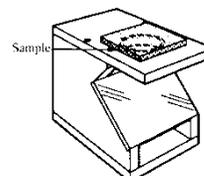


Figure 3. Horizontal Reflection Stage.