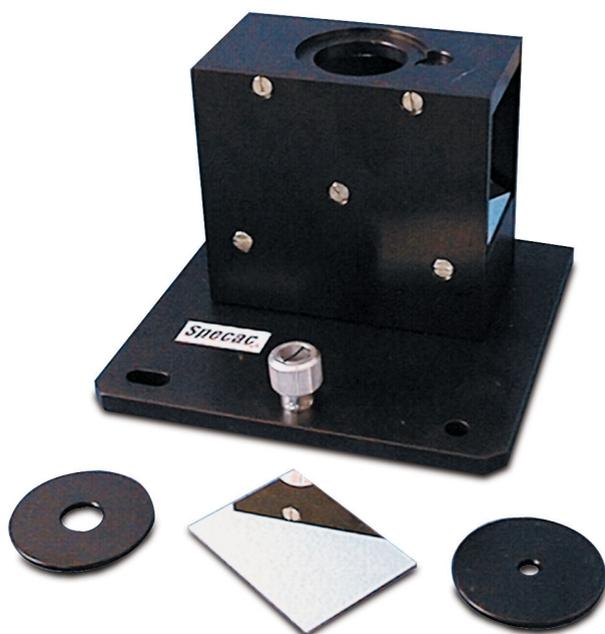


# 30° Fixed Angle Specular Reflectance Accessory



## *User Manual*

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## **30° FIXED ANGLE SPECULAR REFLECTANCE ACCESSORY**

### ***USER MANUAL***

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## *1. Introduction*

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Thank you for purchasing a Specac Product.

Specular reflectance is a non-destructive method for surface measurements using a mirror-like reflection from the surface of a sample. Specular reflectance occurs when the reflected angle of infrared radiation equals the angle of incidence. The amount of light reflected depends on the angle of incidence, the refractive index, surface roughness, and absorption properties of the sample.

The 30° Fixed Angle Specular Reflectance Accessory has been designed for the routine analysis of solid surface coatings such as metal treatments, paints, and polymers. It is installed into a spectrometer using the standard Specac Benchmark series baseplate. This method of mounting provides optimum support and stability of the accessory and therefore reproducible analyses.

## *2. Unpacking and Checklist*

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On receipt of your accessory please check that the following items have been supplied:

- 1 30° Fixed Angle Specular Reflectance Accessory.
- 1 Reference mirror.
- 2 Sample aperture masks (5 mm and 10 mm).
- 1 Benchmark baseplate.

Carefully remove the optical unit from its packing and remove the protective covers from the mirror surfaces. Be careful not to touch the mirrors with your fingertips (use gloves).

### 3. Installation

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The 30° Specular Reflectance Accessory is Benchmark baseplate mounted. The spectrometer's own sample mount will have to be removed before the accessory can be installed.

**Note:** It is usually best to install the Benchmark baseplate in the spectrometer before locating the Specular Reflectance Accessory.

Fixing holes and studs in a Benchmark baseplate will vary depending on the make and model of spectrometer in which it is to be installed. For details of how to install the Benchmark baseplate in your specific spectrometer refer to the appendix of this manual – Benchmark Baseplate Installation Guide.

When the Benchmark baseplate has been installed, secure the Specular Reflectance accessory to the baseplate using the captive thumb screw (1), see figure 1.

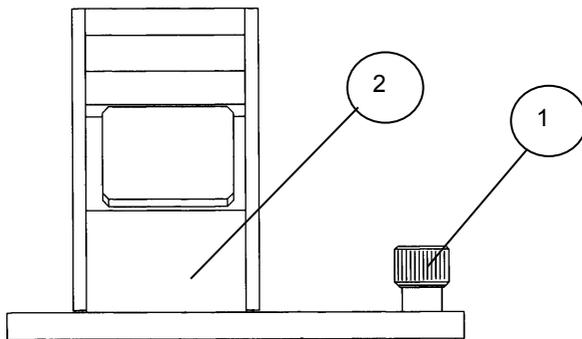


Figure 1: Side view of 30° Specular Reflectance Accessory

## 4. Using the Accessory

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The 30° Specular Reflectance Accessory requires no alignment as the mirror block carrying the mirrors (2) is fixed in position, see figure 1.

Before collecting any sample spectra a background spectrum is required. The reference mirror is used to obtain a background spectrum by placing it reflecting side down over the aperture (3), see figure 2. One of the aperture mask rings (5 mm or 10 mm aperture) can be put in position prior to placing the reference mirror, if required.

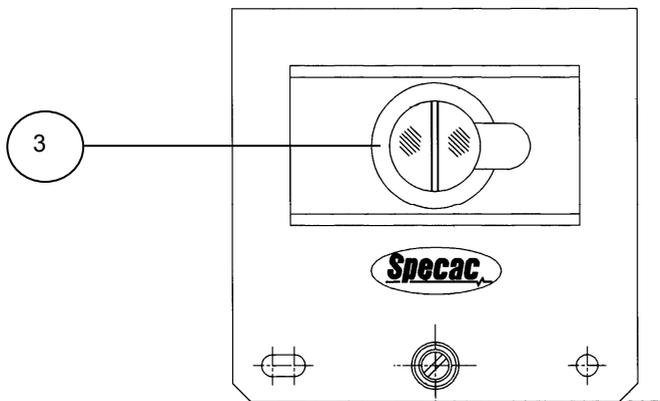


Figure 2: Top View of 30° Specular Reflectance Accessory

A typical background signal throughput for the accessory without an aperture mask is 60% of the signal with no accessory in the sample compartment.

For sampling, replace the reference mirror with the solid sample of interest. There is no restriction regarding the thickness of a sample. The sampling aperture diameter without an aperture mask is 25 mm. For samples of a smaller diameter, the largest possible aperture mask should be used as a sample support.

## *5. Installation of the Benchmark Baseplate into the Spectrometer*

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The following is a description of how to fit a Benchmark baseplate into your spectrometer system. In most cases it is best to fit the Benchmark baseplate into the spectrometer sample compartment first and then fix the accessory to the installed baseplate.

### **Analect FX6200, RFX40/65, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

The baseplate locates via a blade and dowel pin and is retained by tightening of the 6-32UNC screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Biorad FTS7, 40, 60, 65, 100, 135, 155, 165, 175, 185, Excalibur, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the two dowel pins on the underside of the baseplate locating into the spectrometer dowel holes in the floor of the instrument.

Secure the baseplate by screwing the thumb screw at the back of the baseplate into the instrument floor. (A long flat head screwdriver may be of help).

Locate the accessory onto the installed baseplate and secure using the captive thumb screw.

### **Bomem M100 Series (110, 120), Beam direction: Left to Right**

Remove the spectrometer cover and 3" x 2" sample mount to gain access to the sample compartment.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

Fix the Benchmark baseplate to the spectrometer platform with the two 10-32UNC screws supplied.

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Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Bomem MB100 Series (155, 157), Beam direction: Left to Right**

Remove the spectrometer cover and 3" x 2" sample mount to gain access to the sample compartment.

Locate the Benchmark Baseplate onto the kinematic mount of the spectrometer with the three support pillars in a straight line to the front of the compartment. This involves placing the screws on the underside of the baseplate on three location features (a conical countersink, a 'V' slot and a plain flat) on the floor of the spectrometer.

The Benchmark baseplate screws can be adjusted for height and leveling.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Bomem DA3, DA8, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Undo the securing screw in the Benchmark baseplate to loosen the clamping bar underneath.

Install the Benchmark baseplate by locating the inverted 'V' slot and the flat recess on either ends of the baseplate on the two sliding bars on the spectrometer floor.

Tighten the screw to pull the clamping bar against the two slide bars to secure the assembly.

**Note:** *The accessory can be finely aligned by sliding the baseplate along the slide bars before tightening the securing screw.*

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Bruker IFS 25, 45, 48, 66, 85, 88, Vector22, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer from the Bruker baseplate.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

The two fixing screws and dowel pins of the Benchmark plate are passed through the larger hole ends of the slots on the Bruker baseplate and the Benchmark plate is slid from right to left to centralize it on the Bruker plate.

## 30° Fixed Angle Specular Reflectance Accessory

The two screws are then turned anti-clockwise to tighten the plates together.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Bruker Tensor 25 and Quicklock 33, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer from the spectrometer sample compartment.

Place the Benchmark Quicklock™ baseplate into the sample compartment with the two location pins and tapped hole on the front edge of the support plate to the front of the compartment. The baseplate locates securely by connection to the rear with the electric plug sockets and a push clip at the front.

### **Bruker IFS113, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer from the Bruker baseplate.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

The two fixing screws and dowel pins of the plate are passed through the slots of the Bruker plate and the two screws are turned anti-clockwise to tighten the plates together.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Jasco (All Jasco models), Beam direction: Left to Right**

Remove the spectrometer cover and 3" x 2" sample mount to gain access to the sample compartment.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.  
Secure the baseplate in position using the two cap head M4 screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Mattson Alpha, Polaris, Cygnus, Sirius, Beam direction: Left to Right**

There are two sets of pillars supplied with the baseplate for Mattson spectrometers. (Long pillars (1.5") for Galaxy Series and short pillars (0.5") for Genesis Series). Use the 1.5" long pillars with these spectrometers.

Remove any 3" x 2" mount plate used in the spectrometer.

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Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment and such that the dowel pins on the underside of the baseplate locate into the floor of the spectrometer.

Secure the baseplate in position using the two cap head 8-32UNC screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Mattson Galaxy Series 1000, 1020 (As Unicam Analytical (Philips) 9600), Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

The Benchmark baseplate is held in the spectrometer by the instruments kinematic mounting system which incorporates three pin/stud locations and a central magnetic attachment mechanism.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Mattson Galaxy Series 2000, 3000, 4000, 5000, 6000, 7000, Genesis Series, RS, Infinity, Beam direction: Right to Left**

There are two sets of pillars supplied with the baseplate for Mattson spectrometers. (Long pillars (1.5") for Galaxy Series and short pillars (0.5") for Genesis Series).

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment and such that the dowel pins on the underside of the baseplate locate into the floor of the spectrometer.

Secure the baseplate in position using the two cap head 8-32UNC screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Mattson 8000(Old) (3" beam height), Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment and such that the dowel pins on the underside of the baseplate locate into the floor of the spectrometer.

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Secure the baseplate in position using the two cap head 8-32UNC screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Mattson 8000(New) (3.5" beam height), Beam direction: Left to Right**

There are two sets of pillars supplied with the baseplate for Mattson spectrometers. (Long pillars (1.5") for Galaxy Series and short pillars (0.5") for Genesis Series).

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment and such that the dowel pins on the underside of the baseplate locate into the floor of the spectrometer.  
Secure the baseplate in position using the two cap head 8-32UNC screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Midac (All Midac models), Beam direction: Left to Right**

Remove the spectrometer cover and 3" x 2" sample mount to gain access to the sample compartment.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

Secure the baseplate in position using the two cap head 10-32UNC screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Nicolet 500, 700, 710, 740, 800, 5PC, 5SXC, Magna, Protege, Avatar, Nexus, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

Secure the baseplate in position using the two cap head 8-32UNC screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

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### **Nicolet 6000, 60DX, 60SX, 60SXB, 170SX, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

Secure the baseplate in position using the two cap head 8-32UNC screws supplied. Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Nicolet 205, Beam direction: Left to Right**

Remove the spectrometers complete baseplate/sample mount from the sample compartment by pulling it up to release it from the ball catches.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

The baseplate is secured in the spectrometer by the kinematic mount employing three pin/stud locations and four ball catches on three sides of the baseplate edges.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Nicolet 5DX, 5SX, 1MX, 5MX, 10DX, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the two location pins and tapped hole in a straight line to the front of the compartment.

Secure the baseplate in position using the two cap head 8-32UNC screws supplied.

Install the accessory onto the two Benchmark location pins and secure using the captive thumb screw into the tapped hole at the front.

### **Nicolet Impact 400, Beam direction: Left to Right**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

Secure the baseplate in position using the two cap head 8-32UNC screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

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### **Perkin Elmer PE1700, PE1800, Beam direction: Left to Right**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

The baseplate is held in position by two location pins into the front support rail of the spectrometer and by tightening of the pull down thumb nut (supplied) to the instruments own fixing screw that passes through the slot at the front of the baseplate.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Perkin Elmer PE1700 with Shuttle, Beam direction: Left to Right**

The shuttle should be removed before installing the accessory.  
Follow instructions as for the PE1700

### **Perkin Elmer PE2000 , Spectrum2000, GX, Beam direction: Left to Right**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

The baseplate is held in position by two location pins into the front support rail of the spectrometer and by tightening of the pull down thumb nut (supplied) to the instruments own fixing screw that passes through the slot at the front of the baseplate.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Perkin Elmer PE2000 , Spectrum2000, GX, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

The baseplate is held in position by two location pins into the front support rail of the spectrometer and by tightening of the pull down thumb nut (supplied) to the instruments own fixing screw that passes through the slot at the front of the baseplate.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

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### **Perkin Elmer PE1600 Series, Paragon, Spectrum 1000, BX, RX, Beam direction: Left to Right**

Remove the sliding baseplate floor from the sample compartment by pulling it firmly forward. The catch mechanism at the rear will release automatically.

Install the accessory onto the Benchmark baseplate support bar and pillar and secure using the captive thumb screw into the tapped hole in the support bar.

Slide the complete accessory and Benchmark baseplate assembly into the sample compartment. The catch mechanism and Velcro type strips secure the assembly in position.

### **Perkin Elmer PE Spectrum One, Beam direction: Left to Right**

Remove any 3" x 2" mount plate used in the spectrometer.

Slide the Benchmark baseplate into position along the side edges of the sample compartment with the three support pillars in a straight line to the front of the compartment.

The baseplate locates into the spectrometer by engagement of the 15pin connector at the back of the plate into the spectrometer and by guidance clips on the underside of the plate.

The lilac colored pivoting handle on the underside of the plate is pulled towards you when you need to remove the plate from the spectrometer.  
Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Shimadzu 8000, 8100, 8200, 8300, 8500, Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.  
Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

Make sure that the bar on the underside of the baseplate locates in the slot in the spectrometer sample compartment floor.

Move the baseplate from side to side until the location pins in the spectrometer enter the holes in the bar.

Secure the baseplate by screwing the two cap head M5 screws through the baseplate into the spectrometer sample compartment floor.

## 30° Fixed Angle Specular Reflectance Accessory

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Unicam Analytical (Philips) 9600 (As Mattson 1000 series), Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

The Benchmark baseplate is held in the spectrometer by the instruments kinematic mounting system which incorporates three pin/stud locations and a central magnetic attachment mechanism.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Unicam Analytical (Philips) 9800 (As Nicolet 500 series etc), Beam direction: Right to Left**

Remove any 3" x 2" mount plate used in the spectrometer.

Place the Benchmark baseplate into the sample compartment with the three support pillars in a straight line to the front of the compartment.

Secure the baseplate in position using the two cap head 8-32UNC screws supplied.

Install the accessory onto the four Benchmark baseplate pillars and secure using the captive thumb screw into the small central pillar at the front.

### **Any other Spectrometers**

For advice concerning spectrometers not included in this manual please consult your nearest Specac representative



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