

## R200 Reflection Probes

**R200 REFLECTION PROBES** couple to Ocean Optics miniature fiber optic spectrometers and light sources to create small-footprint optical-sensing systems for fluorescence and reflection measurements. Ocean Optics offers several variations on the Reflection Probe:

- ◆ The **R200-7 REFLECTION PROBE** consists of a bundle of 7 optical fibers -- 6 illumination fibers around 1 read fiber -- each of which is 200  $\mu\text{m}$  in diameter. A 3.0" x 0.25" stainless steel ferrule houses the fiber bundle. Other options of this standard probe assembly include the **R400-7**, which has a bundle of optical fibers 400  $\mu\text{m}$  in diameter, and the **RP200-7**, which has a 3.0" x 0.25" plastic ferrule to house the fiber bundle. The RP200-7 is useful where a stainless steel ferrule may not be suitable, such as some applications involving corrosive samples.
- ◆ For reflection experiments across the UV-VIS-Shortwave NIR (200-1100 nm), there is the **R200-MIXED**. The R200-MIXED consists of fourteen 200  $\mu\text{m}$ -diameter optical fibers -- 6 UV/VIS and 6 VIS/NIR illumination fibers, plus 1 UV/VIS fiber and 1 VIS/NIR read fiber. In addition, the R200-MIXED has a 3.0" x 0.25" stainless steel ferrule to house its fiber bundles, and couples easily to a dual-channel spectrometer in which each channel is set for a different wavelength range.
- ◆ Also available is the **R200-REF**, which consists of an R200-7 Reflection Probe and an additional fiber optic to monitor an illumination source such as our LS-1 Tungsten Halogen Light Source. The R200-REF is useful when a reflection experiment either does not allow the user to take frequent reference scans or includes an illumination source with an unstable spectral output.
- ◆ One other option is the **R200-ANGLE REFLECTION PROBE**, which has a bundle of seven 200- $\mu\text{m}$  fibers -- 6 illumination fibers around 1 read fiber -- and a 3.0" x 0.25" stainless steel ferrule with a 45° window. This angled window removes the effects of specular reflection when the probe is immersed in dense liquids and powders.

## Operation

The reflection probe consists of a 6-fiber leg (the illumination leg) that should be coupled to the light source, and a single-fiber leg (the read leg) that attaches to the spectrometer.

1. Inspect the ends of the fiber legs. The hole in the SMA connector is noticeably larger in the illumination leg than the hole in the read leg. Also, the read leg should have colored bands.
2. Attach the illumination leg to the light source. Attach the read leg to the spectrometer.
3. Using the RPH-1 Reflection Probe Holder or some other holding device, point the probe at the surface to be measured.
4. The distance from the probe tip to the sample directly affects the signal. For quantitative results, the distance and angle must be held constant.

## Specifications

Fiber core diameter:	200 $\mu\text{m}$ or 400 $\mu\text{m}$
Fiber core/cladding:	silica
Fiber bundle:	6 illumination fibers around 1 read fiber
Numerical aperture:	0.22
Optimization:	UV/VIS (200-750 nm) and VIS/NIR (450-1000 nm)
Ferrule:	Stainless steel or plastic
Ferrule dimensions:	3.0" x 0.25"
Terminations:	SMA 905
Sheathing:	Blue PVC with Kevlar reinforcement
Temperature range:	-20° C to 80° C
Probe assembly length:	2 meters (breakout is halfway); custom probes are also available