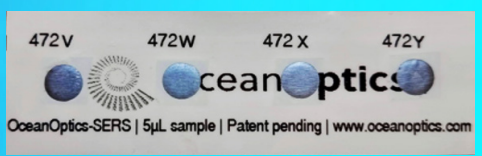
OceanOptics

GMP

Raman Probes and Accessories



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PHOTONICS & MICROTECHNOLOGY

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We Measure What Matters.

01

Dual Wavelength Raman Probe

Unique Raman probe with dual wavelength Raman measurement

Colinear optical design for combining 2 probe optics into one

Both laser beams focus onto the same spot

High throughput optics and a backscattering probe optical design are incorporated into our Raman probes, resulting in a highly efficeint probe for Raman measurements.

Available with 532/785 nm laser combinations

Narrow bandwidth bandpass filter is utilized in the excitation optical train to filter out unwanted silica background generated by the excitation laser in the optical fiber.

High Rayleigh rejection long-pass edge blocking filter (optical density >10^{-6}) is also incorporated in the collection optical train to prevent the laser line from being transmitted into the collection optical fiber.

Features

- **Raman probe** that is ideal for routine laboratory or process measurement applications at 2 different Raman spectral regions.
- Interrogation of the same sample area with **2 different lasers.**
- Can be used for **Raman measurements of all types of samples.**
- Can be used through **glass and plastic containers.**
- Probe body is encased in a hard **anodized aluminum housing.**
- **Removable focusing lens barrel**
- **Optical fibers are removable,** allowing the user the flexibility of using the proper fiber core optimized for a specific Raman instrument.

Specifications

Part Number	ORP-DW-532-785
Excitation Wavelength	532/785 nm
Spectral Range	100-4000 cm^{-1} (The ultimate range is spectrograph/detector dependent)
Spot Size at the Sample	~100 microns for 100 micron core excitation optical fiber
Focal Length	9 mm standard (12,15, & 18 mm optional). Note: Probe efficiency decreases with increasing focal length.
Focusing Lens Barrel	Non-immersion or sealed probe shaft
Probe Body Dimensions	1.5” diameter x 3.8” length
Probe Body Material	Hard anodized aluminum
Probe Shaft Dimensions	3/8” diameter x 6” length
Probe Shaft Material	316 stainless steel (other metals such as Hastelloy and Inconel are available)
Filter Efficiency	OD > 6 at laser wavelength
Operating Temperature	0-85 ºC (non-immersion shaft), 0-325 ºC (sealed shaft)
Maximum Operating Pressure	15 psi (non-immersion shaft), 6000 psi (sealed shaft)
Fiber Configuration	100/200 µm core standard. Note: Custom optical fiber cores are available.
Fiber Optic Cable	3 m reinforced stainless steel armor cable standard, custom lengths available
Coupling System	Laser (FC), Spectrometer (SMA)

02 Raman Process Probe

Swageable focusing, sealed lens shaft ideal for liquid immersion, pressure and vacuum applications

High collection efficiency and effective laser line filtering

Fused silica optics

Fixed, single stainless steel optical fiber cable bifurcated at the distal end

High throughput optics and a backscattering probe optical design are incorporated into our compact Raman probes, resulting in a highly efficient probe for Raman measurements.

Ideal for Raman measurements of various samples including solids, liquids and gases

Available in various laser excitation wavelengths in the visible to the near-infrared.

Narrow bandwidth bandpass filter is utilized in the excitation optical train to filter out unwanted silica background generated by the excitation laser in the optical fiber.

High Rayleigh rejection long-pass edge blocking filter (optical density >10^{-6}) is also incorporated in the collection optical train to prevent the laser line from being transmitted into the collection optical fiber.

Features

- **Fully sealed probe** that can be used for very demanding Raman measurements, such as direct liquid measurements, pressure and vacuum applications.
- The probe body is **encased in a hard anodized aluminum housing** and fully sealed.
- The focusing lens shaft is made of **stainless steel with a step fused silica window compression** sealed at the tip with a Kalrez® o-ring. Other o-rings are available including teflon and gold.
- **The focusing lens** is located inside the tube and behind the optical window.
- **A single stainless steel armor cable** encases both probe optical fibers and split at the distal end into single fiber cables.

Specifications

Part Number	ORP-P785-6
Excitation Wavelength	785 nm, Other wavelength available
Spectral Range	100-4000 cm^{-1} (The ultimate range is spectrograph/detector dependent.)
Focal Length	9 mm standard (12, 15 & 18 mm optional) Note: Probe efficiency decreases with increasing focal length.
Spot Diameter at the Sample	100 microns for standard fiber (fiber core dependent)
Working Distance	7 mm for standard lens
Numerical Aperture	0.22 with standard lens
Probe Body Dimensions	1.3” diameter x 4.5” length
Probe Body Material	Hard anodized aluminum
Probe Body Seal	Buna-N O-ring
Probe Shaft Dimensions	3/8” diameter x 2” length (other lengths available)
Probe Shaft Tip Seal	Kalrez® o-ring
Probe Shaft Material	316 stainless steel (other metals available)
Probe Shaft Window	Sapphire (Fused silica available)
Filter Efficiency	OD > 6 at laser wavelength
Operating Temperature	0-325 ºC
Maximum Operating Pressure	6000 psi
Fiber Configuration	105 µm FC connector (Laser) / 600 µm SMA connector (Spectrometer) Note: Custom optical fiber cores are available.
Fiber Optic Cable	3 m reinforced stainless steel armor cable standard, custom lengths available
Coupling System	Laser (FC), Spectrometer (SMA)

03

Raman Probes

Fiber Optic Probes for Raman Spectroscopy

We offer a number of fiber optic probes that are built specifically for Raman spectroscopy. The ORP-Series probes provide optical filtering of the Rayleigh line and high-signal collection in a compact, rugged design. Compatible with Ocean Optics Raman systems, these probes are suitable for laboratory, industrial and environmental applications and are available for several excitation wavelengths.

Specifications

Excitation Wavelength	532 nm, 638 nm, 785 nm, 830 nm, 1064 nm
Spectral Range	100-4000 cm^{-1} (the ultimate range is spectrometer detector dependent)
Focal Length	9 mm standard (12,15 and 18 mm optional); *Note: Probe efficiency decreases with increasing focal length.*
Spot Diameter at the Sample	100 µm for standard fiber (fiber core dependent)
Working Distance	7 mm for standard lens
Numerical Aperture	0.22 with standard lens
Probe Body Dimensions	2.25” L x 0.96” W x 0.58” H
Probe Body Material	Hard anodized aluminum
Probe Shaft Dimensions	3/8” diameter x 2” length (custom lengths available)
Probe Shaft Material	316 stainless steel
Filter Efficiency	OD >6 at laser wavelength
Operating Temperature	0-85 ºC
Operating Pressure	15 psi
Fiber Configuration	100/600 µm fiber (standard) to laser and spectrometer, respectively; custom optical fiber cores available
Fiber Optic Cable	1 m stainless steel armor cable standard (custom length available)
Coupling System	Laser (FC), Spectrometer (SMA)

Available Items

ORP-532	532 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens.
ORP-532-B	532 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens. Includes 1m long 105µm excitation fiber with FC/PC connectors and 1m long 600µm collection fiber with FC/SMA connectors.
ORP-638	638 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens.
ORP-638-B	638 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens. Includes 1m long 105µm excitation fiber with FC/PC connectors and 1m long 600µm collection fiber with FC/SMA connectors.
ORP-785	785 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens.
ORP-785-B	785 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens. Includes 1m long 105µm excitation fiber with FC/PC connectors and 1m long 600µm collection fiber with FC/SMA connectors.
ORP-830	830 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens.
ORP-830-B	830 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens. Includes 1m long 105µm excitation fiber with FC/PC connectors and 1m long 600µm collection fiber with FC/SMA connectors.
ORP-1064	1064 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens.
ORP-1064-B	1064 nm Raman probe with hard anodized aluminum housing & 10mm focal length lens. Includes 1m long 105µm excitation fiber with FC/PC connectors and 1m long 600µm collection fiber with FC/SMA connectors.

Note: Part Number ending in B (for example ORP-830-B) includes 1 m long 105 µm excitation fiber with FC/PC connectors and 1 m long 600 µm collection fiber with SMA connectors.

Raman Lens Barrels

04

ORP-LWD-47

Non-Contact Long Working Distance Lens Barrel

05

ORP-LB-6

Compression Seal Immersion Lens Barrels

06

ORP-SWD-LB

Short Working Distance Sealed Lens Barrel

Specifications

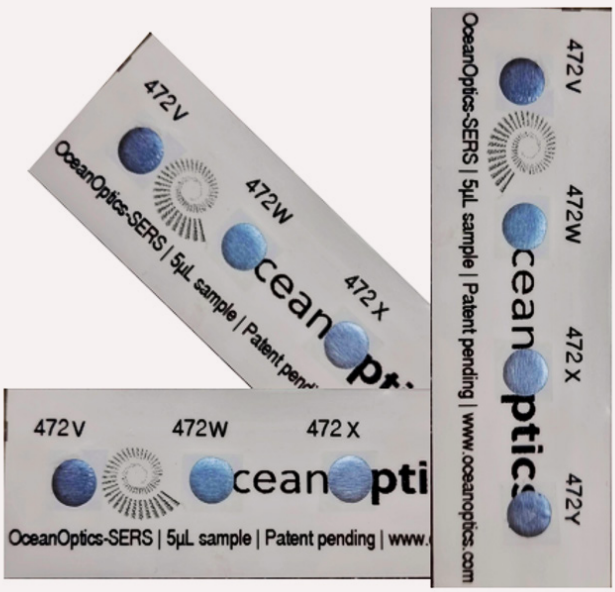
Part Number	ORP-LWD-47
Barrel Material	316 stainless steel
Working Distance	47 mm (20 to 100 mm available)
Numerical Aperture	0.20
Operating Temperature	0 - 125 °C
Maximum Operating Pressure	15 psi

Part Number	ORP-LB-6
Barrel Material	316 stainless steel (Other metals such as Hastelloy, Inconel, Monel, or Titanium available.)
Working Distance	<0.5 mm
Barrel Dimensions	3/8" diameter, 6" long
O-ring Seal	Teflon (Other material available: Kalrez® O-ring)
Pressure Rating	Ambient to >3000 psi
Temperature Range	-40 °C to 350°C
Window	Sapphire (Fused silica available)

Part Number	ORP-SWD-LB
Barrel Material	316 stainless steel (Other metals such as Hastelloy, Inconel, Monel, or Titanium available.)
Working Distance	5 mm (1 mm to 5 mm available)
Barrel Dimensions	3/8" diameter, 6" long
O-ring Seal	Kalrez® O-ring (Other materials available: Teflon, Gold)
Pressure Rating	>3000 psi
Temperature Range	-40 °C to 250°C
Window	Sapphire

07

Surface Enhanced Raman Scattering (SERS)



REPRODUCIBLE | Repeatable substrates allow for confidence in detection and quantification with concentration regressions

STABLE | Long shelf life relieves pressure on test scheduling

ROBUST | Signal Enhancing Heat Sink allows wide range of laser power without compromising substrates

Applications

SERS provides new perspectives in:

- Biomedicine
- Forensics
- Food safety
- Environmental applications
- Threat detection, and
- Medical diagnostics

Field based POC devices potentially outperform their expensive laboratory-based counterparts in speed due to minimum sample preparation

Features

- **Surface Enhanced Raman Scattering (SERS)** is now an even more powerful sensing tool amplifying weak Raman signals from molecules to be detected.
- **HIGH PERFORMANCE** substrates feature a unique and patented SIGNAL ENHANCING HEAT SINK technology.
- Each slide offers **four large active SERS chips** with clear serialization.

Specifications

Parameter	Specification	Units
Substrate Dimensions	75 x 24 x 0.2	mm
Active Area (free chip size)	Ø 6	mm
Number of Active Areas (chips)	4	-
Analyte Volume	5 - 10	µL
Substrate Surface	Polyethylene flexible adhesive film	
Raman Laser Excitation Wavelength Range	671 / 785 / 830 / 1064	nm
Shelf Life for Optimum Performance	8	months
Long Term Storage Temperature	5 - 60 (40 - 140)	°C (°F)
Long Term Storage Humidity	< 50, non condensing	% RH

Item Code	Description	Total SERS Chips
RAM-SERS-LP-1	1-unit 1×3” flexible & adhesive substrate with 4 SERS active chips	4
RAM-SERS-MS-1	1 substrate with 4 SERS chips on a microscope slide, in a plastic box	4
RAM-SERS-MS-5	5 substrates, each with 4 SERS chips on a microscope slide, in a plastic box	20

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