

# System Product Information

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## *i*-Spec Lab Spectrometers



Lab enclosure, broadband, high energy/long lifetime lamp assembly, Si/InGaAs or PBS detectors, USB interface, fan-cooled, Spectralon reference disk, BWSpec software

**BWS005** 400-2200nm

**BWS010** 400-1000nm

**BWS015** 920-1700nm

**BWS025** 1100-2200nm

**BWS035** 1200-2400nm

**BWS045** 400-2400nm

**BWS055** 190-1700nm

**BWS065**

To be specified

Single fiber

SMA

Extra fiber length

To be ordered separately

Extra fiber

Probes or sensors

IQ, OQ Documents

## OnlinePro Process Spectrometers-Free Space



NEMA enclosure, broadband, high energy/long lifetime lamp assembly, Si/InGaAs or PBS detectors, USB interface, fan-cooled, Manual Spectralon reference, BWSpec software

### Free Space

<b>BWS105</b>	400-2200nm
<b>BWS115</b>	400-1700nm
<b>BWS125</b>	900-1700nm
<b>BWS135</b>	1100-2200nm
<b>BWS145</b>	1200-2900nm
<b>BWS155</b>	200-2200nm

#### To be specified

Cooling Mechanism: TE, Vortex or Fan

To be ordered separately

TE cooler, Vortex cooler or Fan

Purging system

IQ, OQ Documents

## OnlinePro Process Spectrometer-Fiber Based



NEMA enclosure, broadband, high energy/long lifetime lamp assembly, Si/InGaAs or PBS detectors, USB interface, fan-cooled, Manual Spectralon reference, BWSpec software

### Fiber-based

<b>BWS205</b>	400-2200nm
<b>BWS215</b>	400-1700nm
<b>BWS225</b>	900-1700nm
<b>BWS235</b>	1100-2200nm
<b>BWS245</b>	1200-2900nm <u>To be specified</u> Single fiber or fiber bundle SMA or TNC connectors Cooling mechanism: TE, Vortex or Fan <u>To be ordered separately</u> Fiber Probes or sensors TE cooler, Vortex cooler or Fan Purging system IQ, OQ Documents

## OnlinePro Process Spectrometer with Built-in Multiplexer



**BWS305**

Multiplexer, up to 16 Channels with SMA or TNC connectors (SMA and TNC connectors must be ordered separately)

To be specified

Single fiber or fiber bundle

Fiber length

Numbers for channels with SMA or TNC connectors

To be ordered separately

Fiber

Probe or sensor

Purging system



## Raman Spectrometer System

*i*-Raman Lab Raman System

Lab enclosure, Cleanlaze inside, Si array detector, 5cm-1 spectral resolution, USB interface, fan-cooled, 1.5 meter lab bifurcated fiber Raman probe, BWSpec software

**BWS415-532**

532nm Laser excitation

**BWS415-785**

785nm Laser excitation

To be specified

To be ordered separately

Raman Probe

Battery Pack



**BWS425-532**

**BWS425-785**

**Online Raman Process system**

**NEMA enclosure, Cleanlaze inside, Si array detector, USB interface, 1.5 meter lab bifurcated fiber Raman probe, BWSpec software**

**Vortex, TE cooler or Fan**

**532nm Laser excitation**

**785nm Laser excitation**

**Raman Microscope**

**BWS435-532**

**BWS435-785**

**532nm Laser excitation**

**785nm Laser excitation**

## Accessories

### Accessories and Probes

#### Pre-Aligned Lamp Assemblies

- BAC001** Lamp assembly
- BAC002** Replace Lamp 20watts for BAC007
- BAC007** Lamp assembly with illumination/reference fiber ports and shutters

#### Optical Fibers

- BAC003** Bifurcated full bundle terminated by SMA connectors
- BAC004** 600 micron, low OH, single fiber terminated by SMA connector, PVC jacket
- BAC005** Termination for BAC004
- To be Specify
- BAC006** Stainless steel jacket other than PVC

#### Turntable

- BAC010** Turn table for diffuse reflectance measurement

#### Flow Cell with Sanitary Flanges

Stainless steel spool with sanitary flanges, AAA approved, 303 stainless steel

- BAC020** 2" reflectance flow cell, 82.6 mm long
- BAC021** 4" reflectance flow cell, 82.6 mm long
- BAC022** 6" reflectance flow cell, 82.6 mm long
- BAC023** 1 1/2" reflectance flow cell, 82.6 mm long
- BAC024** 2" transfectance flow cell, 82.6 mm long
- BAC025** 1-1/2" transmission flow cell, 82.6 mm long
- BAC026** 2 1/2" reflectance flow cell, 82.6 mm long
- BAC027** 3" reflectance flow cell, 82.6 mm long
- BAC028** Sanitary flanged reflectance probe

#### To be specified

Pathlength for transfectance or transmission flow cell  
Material other than 303 stainless steel  
O-ring material

## Flow Cell with ANSI Flanges or Swagelok Fitting

- BAC030** Cross-flow side-stream liquid flow cell  
Connector to single fiber or micro fiber bundle terminated by SMA connectors, single path, 316 stainless steel, 1/2" Swagelok fitting connection  
To be specified  
material other than 316 stainless steel  
o-ring material other than Kalrez
- BAC160** Raman flow cell for Lab probe
- BAC161** Raman flow cell for industrial probe
- BAC031** Transmission on-line flow cell with ANSI flanges  
Connector to single fiber or micro fiber bundle terminated by SMA connectors, single path, 316 stainless steel  
To be specified  
pipe size  
pipe schedule  
material other than 316 stainless steel  
o-ring material other than Kalrez  
flange other than 150 LB



## Diffuse Reflectance Probe

- BAC034** **Bright-field reflectance probe**  
For Raman, Fluorescence or reflectance including specular components measurements.  $\phi 3/8$ " diameter, 4" shaft length, quartz window, epoxy sealed.
- BAC035** **Dark-field diffuse reflectance/transmission probe**  
Dual purpose for transmission and reflection,  $\phi 1/2$ " shaft diameter, 8" shaft length for reflectance measurement;  $\phi 7/8$ " shaft diameter and 9" shaft length for transreflectance measurement with adjustable pathlength. Sapphire window, 316 stainless steel, Kalrez o-ring seal, 1.5 meter bifurcated fiber bundle terminated by TNC connectors and push-button triggering switch  
To be specified  
  
gold brazing seal if no o-ring seal  
shaft length other than 8"

fiber length other than 1.5 meters  
material other than 316 stainless steel  
o-ring material other than Kalrez

**BAC036** **Sapphire ball tipped diffuse reflectance probe**

Sapphire ball tip,  $\phi$  12mm shaft diameter, 8" shaft length, 316 stainless steel, Kalrez o-ring seal, 1.5 meter bifurcated fiber bundle terminated by SMA connectors

To be specified

shaft length other than 8"  
fiber length other than 1.5 meters  
material other than 316 stainless steel  
o-ring material other than Kalrez

**Transflectance Probe**

**BAC037** **Transflectance probe**

Single fiber terminated by SMA connectors, selectable or adjustable pathlength,  $\phi$ 12mm shaft diameter, 8" shaft length, 316 stainless steel, sapphire window, Kalrez o-ring seal, a pair of 1.5 meter single fibers

To be specified

style option: A: selectable pathlength  
B: adjustable pathlength  
shaft length other than 10"  
fiber length other than 1.5 meters  
material other than 316 stainless steel  
o-ring material other than Kalrez

**BAC038** **Bubble shedding transflectance probe**

Sapphire ball tip, 1.5 meter bifurcated fiber bundle terminated by TNC connectors,  $\phi$ 12 mm shaft diameter, 8" shaft length, 316 stainless steel, Kalrez o-ring seal, variable pathlength

To be specified

multiple pathlength  
shaft length other than 8"  
fiber length other than 1.5 meters  
material other than 316 stainless steel  
o-ring material other than Kalrez

**BAC039** **High temperature/pressure probe**

Single path, SMA connection with single fibers,  $\phi$ 5/8 mm shaft diameter, 8" shaft length, 316 stainless steel, sapphire window, fixed pathlength

**BAC040** **Retractable reflectance probe**

Sapphire ball tip, 1.5 meter bifurcated fiber bundle terminated by TNC connectors,  $\phi$ 12 mm shaft diameter, 13.2" shaft length, 316 stainless steel, Kalrez o-ring seal, variable pathlength, 5" insertion length of retractable housing, Ingold fitting

To be specified

multiple pathlength  
fiber length other than 1.5 meters  
material other than 316 stainless steel  
o-ring material other than Kalrez

**Sapphire Window****BAC045** 1.5" Sapphire Window Assembly

For on-line free space applications, 304 stainless steel,  $\phi$ 1.5" clear aperture, 1/2" thick, Klingersil C4430 gasket

**Long-Path Gas Cell****BAC046** Variable long-path gas cellTo be specified

pathlength 0.4, 0.8, 1.2, 1.6, 2.0, 2.4 or 2.8 meters

**Holders****BAC047**

Cuvette holder without heater  
Anodized aluminum body, dual purpose for single fiber or fiber bundle

**BAC048**

Vial holder

**BAC049**

Capillary holder

**BAC150**

BAC100 Raman Probe holder, magnetic base, micrometer head

**BAC151**

BAC100 Raman Probe holder for cuvette measurement

**Climate Control Accessories, Purging Systems and Filters****BAC050**

Z purging system, Class I, Div II, group A through G  
System includes 2 cubic feet Z purging systems, wiring conduit sealing fittings and packing materials

**BAC051**

X purging system, Class I, Div I, group A through G  
System includes 2 cubic feet X purging system, wiring conduit sealing fittings, signal disconnect module and packing materials

**BAC052**

550 BTU Vortex cabinet cooler

**BAC053**

1500 BTU Vortex cabinet cooler

**BAC054**

Vortex cooled heat exchanger

**BAC055**

500/680 BTU TE cooler/heater

**BAC056**

30 watts panel heater

**BAC057**

200 watts panel heater

**BAC058**

Dust filter insert for Vortex cooler

**BAC059**

Moist filter for Vortex cooler

**BAC060**

Stainless steel body solenoid valve for Vortex cooler ( specify: 120 VAC or 230 VAC)

- BAC061** Automatic feeder
- BAC062** Air curtain
- BAC063** Laser safety goggle

### Reference Standard

- BAC065** Manual reference standard
- BAC066** Automatic reference standard

### Computer and Software

- BAC080** Computer
- BAC081** Unscrambler
- BAC082** Symbion
- BAC083** Grams/Ai
- BAC084** PLSplusIQ for AI 7

### Batteries

- BAC090** External Li-polymer rechargeable battery pack
- BAC091** Internal Li ion battery pack for *i*-Raman and *i*-Spec

### Raman Probe

- BAC100-785** Raman probe for 785nm excitation, lab version
- BAC100-532** Raman probe for 532 nm excitation, lab version
- BAC101-785** Raman probe for 785nm excitation, industrial version
- BAC101-532** Raman probe for 532 nm excitation, industrial version

### Service & Support Personnel / day / hr

#### Application Support:

- BAC070** Feasibility Study
- BAC071** A) Application Specialist by day + expenses ( Door to Door )
- BAC072** B) Application Specialist Hourly + expenses ( Door to Door )
- BAC073** C) Traveling per mile by car
- BAC074** Additional 12-month parts and labor service contract
- BAC075** Additional 12-month parts service contract

## Reference Information

1. Wavelength range (nm)

First preference	Second preference	Customer specified
900-1700 1100-2200	850-1600 1000-1800 1200-2300	

2. Numerical aperture and minimum bending radius of fibers

**NA 0.22, 5 cm bending radius for 600  $\mu$  single fiber**  
**NA 0.21, 5 cm bending radius for 250  $\mu$  Zirconium single fiber**  
**NA 0.30, 20 cm bending radius for 750  $\mu$  Chalcogenide single fiber**  
**NA 0.22, 5 cm bending radius for 200  $\mu$  micro fiber bundle**

3. Maximum air consumption for Vortex cooler

Model	BTU	Air Consumption (SCFM)	Air Pressure
	550	11	80-120 psi
	1500	25	80-120 psi