

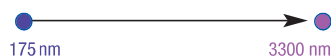
# Technical Specifications for the LAMBDA 1050 UV/Vis/NIR and LAMBDA 950 UV/Vis/NIR Spectrophotometers



## LAMBDA 1050

Choose the LAMBDA 1050 with its triple detector capability for ultra-high UV/Vis/NIR performance for wavelengths up to 3300 nm with extreme sensitivity in the NIR region (800-2500 nm) and higher energy throughput. For applications such as highly reflective and anti-reflective coatings, all types of glass from clear to highly absorbing safety glass, optical filters of all types from the deep UV through the NIR and many more applications requiring the best photodynamic range and the widest possible sampling capability.

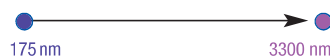
UV-Vis-NIR



## LAMBDA 950

Choose the LAMBDA 950 for ultra-high UV/Vis/NIR performance for wavelengths up to 3300 nm, high-precision measurements, and for applications such as highly reflective and anti-reflective coatings, color correction coatings, bandpass characteristics of UV, Vis and NIR filters, and more.

UV-Vis-NIR



## Introduction

PerkinElmer® UV/Vis and UV/Vis/NIR spectrophotometers are built to the highest ISO-9001 manufacturing standards. This document presents confirmed performance specifications based on factory tests.

All instruments will meet or achieve better than the confirmed specifications, under normal conditions of use as described in the user manual.

The LAMBDA™ Series of spectrophotometers is the industry standard for high performance, flexibility and convenience. Each model includes the same range of modular components and snap-in accessories to tackle a range of tough applications. Whatever specifications you require, the LAMBDA Series provides best-in-class accuracy, precision and reproducibility.

## Technical description and specifications

### LAMBDA 1050

### LAMBDA 950

#### Principle

Double beam, double monochromator, ratio recording UV/Vis/NIR spectrophotometers with microcomputer electronics, controlled by DELL™ PC or compatible personal computer.

## Technical description and specifications

### LAMBDA 1050

### LAMBDA 950

|                                                                       |                                                                                                                                                                                                                                                                                                            |                                                                                                                                                         |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Optical System</b>                                                 | All reflecting optical system (SiO <sub>2</sub> coated) with holographic grating monochromator with 1440 lines/mm UV/Vis blazed at 240 nm and 360 lines/mm NIR blazed at 1100 nm, Littrow mounting, sample thickness compensated detector optics.                                                          |                                                                                                                                                         |
| <b>Beam Splitting System</b>                                          | Chopper (46+ Hz, Cycle: Dark/Sample/ Dark/Reference, Chopper Segment Signal Correction).                                                                                                                                                                                                                   |                                                                                                                                                         |
| <b>Detector</b>                                                       | Photomultiplier R6872 for high energy in the entire UV/Vis wavelength range. Combination of high performance Peltier-cooled InGaAs detector, 2 options: Narrow band covering 860-1800 or wide band covering 860-2500 nm and Peltier-cooled PbS detector for 1800/2500-3300 nm in the NIR wavelength range. | Photomultiplier R6872 for high energy in the entire UV/Vis wavelength range. High performance Peltier-cooled PbS detector for the NIR wavelength range. |
| <b>Source</b>                                                         | Pre-aligned tungsten-halogen and deuterium. Utilizes a source doubling mirror for improved UV/Vis/NIR energy.                                                                                                                                                                                              | Pre-aligned tungsten-halogen and deuterium.                                                                                                             |
| <b>Wavelength Range</b><br>N <sub>2</sub> purge required below 185 nm | 175 nm - 3300 nm                                                                                                                                                                                                                                                                                           | 175 nm - 3300 nm                                                                                                                                        |
| <b>UV/Vis Resolution</b>                                              | ≤ 0.05 nm                                                                                                                                                                                                                                                                                                  | ≤ 0.05 nm                                                                                                                                               |
| <b>NIR Resolution</b>                                                 | ≤ 0.20 nm                                                                                                                                                                                                                                                                                                  | ≤ 0.20 nm                                                                                                                                               |
| <b>Stray Light</b>                                                    |                                                                                                                                                                                                                                                                                                            |                                                                                                                                                         |
| At 200 nm<br>12 g/l KCl USP/DAP method                                | > 2 A                                                                                                                                                                                                                                                                                                      | > 2 A                                                                                                                                                   |
| At 220 nm<br>10 g/l NaI ASTM method                                   | ≤ 0.00007 %T                                                                                                                                                                                                                                                                                               | ≤ 0.00007 %T                                                                                                                                            |
| At 340 nm<br>50 mg/l NaNO <sub>2</sub> ASTM method                    | ≤ 0.00007 %T                                                                                                                                                                                                                                                                                               | ≤ 0.00007 %T                                                                                                                                            |
| At 370 nm<br>50 mg/l NaNO <sub>2</sub> ASTM method                    | ≤ 0.00007 %T                                                                                                                                                                                                                                                                                               | ≤ 0.00007 %T                                                                                                                                            |
| At 1420 nm<br>H <sub>2</sub> O 1 cm path length                       | ≤ 0.00040 %T                                                                                                                                                                                                                                                                                               | ≤ 0.00040 %T                                                                                                                                            |
| At 2365 nm<br>CHCl <sub>3</sub> 1 cm path length                      | ≤ 0.00050 %T                                                                                                                                                                                                                                                                                               | ≤ 0.00050 %T                                                                                                                                            |
| <b>Wavelength Accuracy</b>                                            |                                                                                                                                                                                                                                                                                                            |                                                                                                                                                         |
| UV/Vis                                                                | ± 0.080 nm                                                                                                                                                                                                                                                                                                 | ± 0.080 nm                                                                                                                                              |
| NIR                                                                   | ± 0.300 nm                                                                                                                                                                                                                                                                                                 | ± 0.300 nm                                                                                                                                              |
| <b>Wavelength Reproducibility</b>                                     |                                                                                                                                                                                                                                                                                                            |                                                                                                                                                         |
| UV/Vis (Deuterium lamp lines)                                         | ≤ 0.010 nm                                                                                                                                                                                                                                                                                                 | ≤ 0.020 nm                                                                                                                                              |
| NIR (Deuterium lamp lines)                                            | ≤ 0.040 nm                                                                                                                                                                                                                                                                                                 | ≤ 0.080 nm                                                                                                                                              |
| Standard deviation of<br>10 measurements UV/Vis                       | ≤ 0.005 nm                                                                                                                                                                                                                                                                                                 | ≤ 0.005 nm                                                                                                                                              |
| Standard deviation of<br>10 measurements NIR                          | ≤ 0.020 nm                                                                                                                                                                                                                                                                                                 | ≤ 0.020 nm                                                                                                                                              |

**Technical description  
and specifications****LAMBDA 1050****LAMBDA 950****Photometric Accuracy**

|                                                                        |            |            |
|------------------------------------------------------------------------|------------|------------|
| Double Aperture Method 1 A                                             | ± 0.0003 A | ± 0.0006 A |
| Double Aperture Method 0.5 A                                           | ± 0.0003 A | ± 0.0003 A |
| NIST 1930D Filters 2 A                                                 | ± 0.0030 A | ± 0.0030 A |
| NIST 930D Filters 1 A                                                  | ± 0.0030 A | ± 0.0030 A |
| NIST 930D Filters 0.5 A                                                | ± 0.0020 A | ± 0.0020 A |
| K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> -Solution USP/DAP method | ± 0.0080 A | ± 0.0080 A |

**Photometric Linearity**

Addition of filters UV/Vis at  
546.1 nm, 2 nm slit, 1 second  
integration time

|                        |            |            |
|------------------------|------------|------------|
| At 1.0 A               | ± 0.0060 A | ± 0.0060 A |
| At 2.0 A               | ± 0.0160 A | ± 0.0170 A |
| At 3.0 A               | ± 0.0050 A | ± 0.0200 A |
| NIR At 1.0 A (1200 nm) | ± 0.0005 A |            |
| NIR At 2.0 A (1200 nm) | ± 0.0010 A |            |

**Photometric Reproducibility**

Standard deviation for 10  
measurements, 2 nm slit,  
1 second integration time  
1 A with NIST 930D Filter  
at 546.1 nm

≤ 0.00016 A

≤ 0.00016 A

0.5 A with NIST 930D Filter  
at 546.1 nm

≤ 0.00008 A

≤ 0.00008 A

0.3 A with NIST 930D Filter  
at 546.1 nm

≤ 0.00008 A

≤ 0.00008 A

**Photometric Range**

UV/Vis

8 A

8 A

NIR

8 A

6 A

**Photometric Display**

Unlimited

Unlimited

**Bandpass**

0.05 nm - 5.00 nm in 0.01 nm increments UV/Vis range

0.20 nm - 20.00 nm in 0.04 nm increments NIR range

Fixed resolution, constant energy or slit programming.

**Photometric Stability**

After warm-up at 500 nm, 0 A,  
2 nm slit, 2 second integration  
time, peak to peak

≤ 0.0002 A/h

≤ 0.0002 A/h

**Baseline Flatness**

190 nm - 3100 nm, 2 nm slit

0.20 second integration time

UV/Vis, no smoothing applied

± 0.0008 A

± 0.0008 A

0.24 second integration time

NIR, no smoothing applied

**Technical description  
and specifications****LAMBDA 1050****LAMBDA 950****Photometric Noise RMS**

2 nm slit, 1 second integration time

|                                              |              |             |
|----------------------------------------------|--------------|-------------|
| 0 A and 190 nm                               | ≤ 0.00010 A  | ≤ 0.00010 A |
| 0 A and 500 nm                               | ≤ 0.00005 A  | ≤ 0.00005 A |
| 2 A and 500 nm                               | ≤ 0.00020 A  | ≤ 0.00020 A |
| 4 A and 500 nm                               | ≤ 0.00100 A  | ≤ 0.00100 A |
| 6 A and 500 nm                               | ≤ 0.00500 A  | ≤ 0.00500 A |
| 0 A and 1500 nm                              | ≤ 0.00002 A  | ≤ 0.00004 A |
| 2 A and 1500 nm                              | ≤ 0.00010 A  | ≤ 0.00010 A |
| 3 A and 1500 nm,<br>PbS (Servo)              | ≤ 0.00250 A  | ≤ 0.00300 A |
| 0 A and 1500 nm InGaAs                       | ≤ 0.00002 A  |             |
| 2 A and 1500 nm InGaAs                       | ≤ 0.00010 A  |             |
| 3 A and 1500 nm,<br>Wide Band InGaAs (Servo) | ≤ 0.00010 A  |             |
| 3 A 1500 nm,<br>Narrow Band InGaAs (Servo)   | ≤ 0.000025 A |             |

**Primary Sample Compartment**

|                               |                          |                          |
|-------------------------------|--------------------------|--------------------------|
| <b>Dimensions (W x D x H)</b> | 200 mm x 300 mm x 220 mm | 200 mm x 300 mm x 220 mm |
|-------------------------------|--------------------------|--------------------------|

**Secondary Sample Compartment**

|                               |                          |                          |
|-------------------------------|--------------------------|--------------------------|
| <b>Dimensions (W x D x H)</b> | 480 mm x 300 mm x 220 mm | 480 mm x 300 mm x 220 mm |
|-------------------------------|--------------------------|--------------------------|

**Purging**

|                    |     |     |
|--------------------|-----|-----|
| Optics             | YES | YES |
| Sample Compartment | YES | YES |

**Instrument Dimension**

|                    |                           |                           |
|--------------------|---------------------------|---------------------------|
| <b>(W x D x H)</b> | 1020 mm x 740 mm x 300 mm | 1020 mm x 740 mm x 300 mm |
|--------------------|---------------------------|---------------------------|

**Instrument Weight**

|         |         |
|---------|---------|
| ~ 77 kg | ~ 77 kg |
|---------|---------|

**Digital I/O**

|          |          |
|----------|----------|
| RS 232 C | RS 232 C |
|----------|----------|

**Light Beam**

|                                                                              |
|------------------------------------------------------------------------------|
| 90 mm above the base plate, 120 mm beam separation, 3 mm - 12 mm beam height |
|------------------------------------------------------------------------------|

**Instrument Requirements**

|                      |                                             |                                             |
|----------------------|---------------------------------------------|---------------------------------------------|
| Power                | 90 VAC - 250 VAC, 50/60 Hz; 250 VA          | 90 VAC - 250 VAC, 50/60 Hz; 250 VA          |
| Temperature          | 10 °C - 35 °C                               | 10 °C - 35 °C                               |
| Recommended Humidity | 10-70% relative humidity,<br>non-condensing | 10-70% relative humidity,<br>non-condensing |

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