

The General Purpose Optical Bench (GPOB) for the LAMBDA 650 and 850 UV/Vis Spectrophotometers and LAMBDA 950 UV/Vis/NIR Spectrophotometer



Introduction

The LAMBDA™ 650/850/950 family of UV/Vis and UV/Vis/NIR spectrophotometers are purpose-designed to enable a wide range of sample types to be analyzed, no matter the shape or dimensions. The standard sample compartment is the largest in the industry, providing plenty of room for accurate sample positioning and the use of accessories such as polarizers.

In addition, the 60 mm and 150 mm integrating spheres, the URA (Universal Reflectance Accessory) and the standard transmission optics are mounted in intelligent sampling modules which snap in and out of the huge second sampling area to allow rapid switching between sample types. The new configuration is immediately ready for work with no alignment or adjustment needed.

Key Features

- ▶ Fully configurable optics for highly reproducible and accurate transmission and reflectance measurements
- ▶ Allows measurements on samples with pathlengths of up to 400 mm
- ▶ Easily accommodates large and awkwardly-shaped samples
- ▶ Available for the LAMBDA 650 and 850 UV/Vis and LAMBDA 950 UV/Vis/NIR spectrophotometers



Figure 1. The dual sampling areas on the LAMBDA™ 650/850/950.

Figure 1 shows the standard sample compartment (left) with liquid cell holders and the 150 mm integrating sphere sampling module (above).

However, some types of sample require even more space or a specialized optical arrangement. In this case the unique GPOB

(General-Purpose Optical Bench) replaces both sampling areas, providing a huge baseplate that allows the user to configure the optical path to suit the precise requirements of the analysis. Transmittance measurements on samples of up to 400 mm path-length can be easily accomplished.

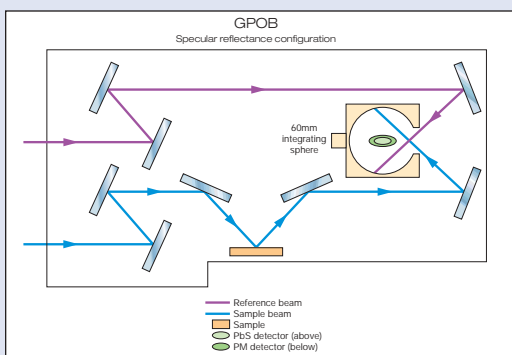
The General-Purpose Optical Bench (GPOB)

The GPOB consists of a magnetic optical bench which can be configured with a variety of locating pins, magnetic mounts and kinematic mounts. This allows custom optical layouts to be designed and built, positioning sampling accessories, sample holders and detectors exactly where they're needed. Optional component kits include convex or flat mirrors, iris apertures to reduce and control the beam size and sample mounts, which may be placed at any angle on the GPOB baseplate. As a result, the GPOB is the most versatile accessory available for the analysis of demanding samples. Applications are virtually limitless and include :

- Lenses and telescopes
- Concave and convex mirrors
- Laser rods
- Beamsplitters
- Sun protection, automobile and architectural glass

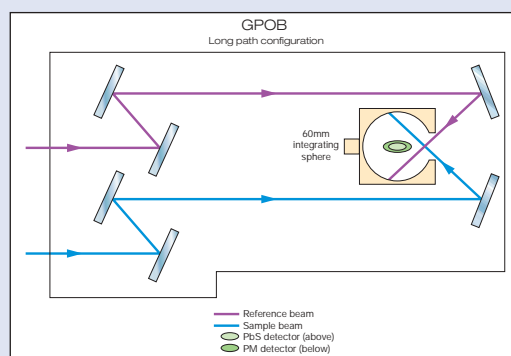
Typical configurations

Figure 2 shows three example configurations, for the measurement of specular reflectance, long pathlength transmittance and variable angle transmittance. In each case a 60 mm integrating sphere is used as the detector.

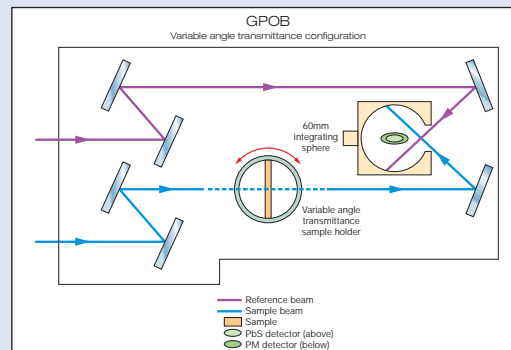


Specular reflectance configuration

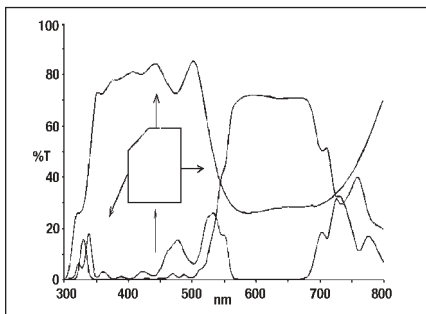
A long path configuration



Variable angle transmittance configuration

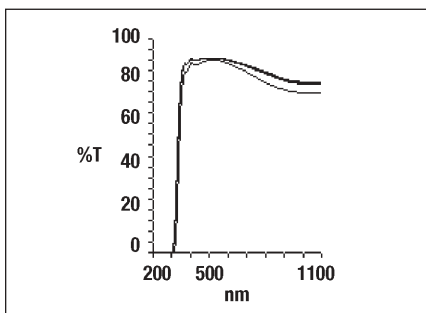


Applications



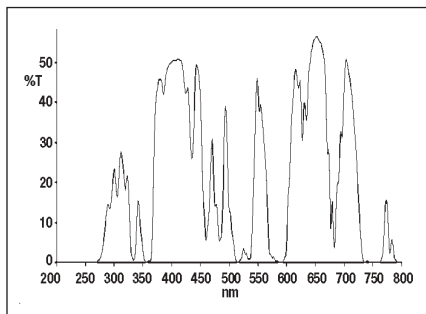
- Characterization of a cube beamsplitter

The reflectance and transmittance of a beamsplitter was analyzed using the standard integrating sphere detector and mirror kit. The three spectra shown are measured at three different points on the beamsplitter.



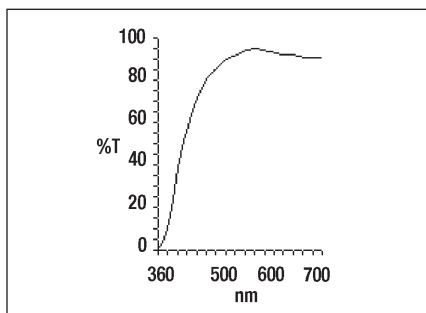
- Solar characterization of architectural and automobile glass

The minimum and maximum transmission of a sample of automobile window glass can easily be measured using the 60 mm sphere detector and the variable angle transmittance mount. These measurements are specified by several national and international organizations such as the US Transportation and Energy Department.



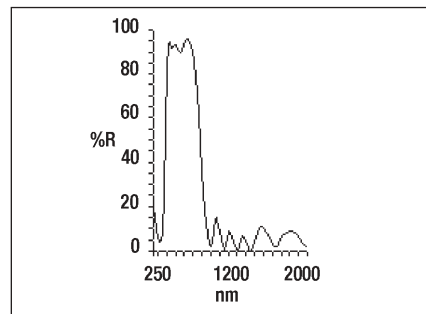
- Measurement of crystal glass

The performance of the LAMBDA™ 950 with the GPOB is shown by this transmittance spectrum of artificial crystal glass. The sample was 20 cm long with a diameter of 0.8 mm, and a 0.4 mm beam mask was used to aperture the input beam down before the sample. The 60 mm integrating sphere detector was used. Despite the high energy losses the signal-to-noise performance is excellent.



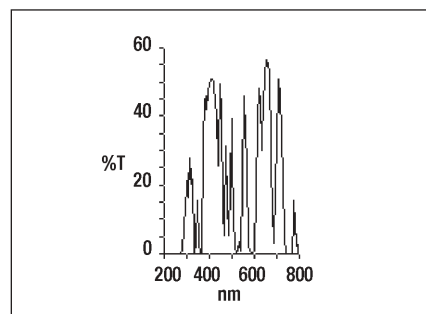
- Typical transmittance measurement of a telescope camera lens

Telescope lenses are checked for transmission characteristics in the visible range. The above graph shows a 200 mm telescope lens measured with the detector sphere of the general-purpose optical bench.



- Reflectance measurement of parabolic lamp reflector

Using the the 60 mm sphere detector and two mirrors from the optional mirror kit, the reflectance from the specular surface of a parabolic aluminized reflector can be measured. This is a typical measurement in the lighting industry.



- Laser rods measured with the GPOB and iris diaphragm (Dimensions: 250 mm long, 8 mm diameter)

The transmittance characteristics of the rods used in commercial lasers are measured using the GPOB. This example was 250 mm long and 8 mm in diameter and required the use of an iris diaphragm to reduce the beam diameter.

Accessory kits for the GPOB

- **General purpose optical bench for LAMBDA™ 650/850/950 Spectrophotometer.** Features a magnetized, ruled, optical bench with a moveable 60 mm detector integrating sphere. Samples up to 400 mm in pathlength can be analyzed using the GPOB.
- **Sample holder mount kit (Part No.: PELA-1005).** Includes two cantilever sample holders with magnetic bases.
- **Variable angle transmittance sample holder kit (Part No.: PELA-1006).** Holds samples at an accurately measured angle to the incident beam for measurement of transmittance. Samples can be up to 1 cm thick and up to 10 cm square. Essential for variable angle transmittance measurements of filters, lenses and beamsplitters.
- **Lens assembly kit (Part No.: PELA-1007).** Focuses the beam to a small spot by means of a number of plano-convex lenses and iris diaphragms. The lenses are mounted on magnetized bases for easy placement on the optical bench. Lenses are available in various focal lengths.
- **Optical bench kit (Part No.: PELA-1008).** Includes two magnetically mounted iris diaphragms and two optical rails with mounts designed for the standard PerkinElmer accessories.
- **Fiber optic reference feed kit (Part No.: PELA-1009).** Allows the reference beam to be introduced into the sphere via a flexible fiber optic bundle. This eliminates the need to use mirrors to direct the reference beam into the sphere, and allows a wider variety of geometries to be used.
- **Light trap aperture kit (Part No.: PELA-1010).** Consists of black light traps and iris diaphragms specially mounted for use with the GPOB.
- **Specular reflectance kit (Part No.: PELA-1011).** Includes six mirrors on magnetized bases that can be easily placed on the base plate of the GPOB. Included are two square flat mirrors, two concave, and two convex mirrors.
- **Flat mirror kit (Part No.: PELA-1012).** Includes two 2 inch square plane mirrors on magnetic mounts.
- **Short focal length mirror kit (Part No.: PELA-1013).** Consists of a short focal length (20-30 mm) concave mirror on an adjustable base with a magnetic mount to allow for small spot incidence on curved samples.
- **Beam blocker kit (Part No.: PELA-1014).** An optically black beam blocker with a magnetic mount.
- **Fiber optic measurement stage and holder kit (Part No.: PELA-1015).** Includes two fiber optic holders for measurement of small diameter fibers and fixed apertures.

PerkinElmer Life and Analytical Sciences
710 Bridgeport Avenue
Shelton, CT 06484-4794 USA
Phone: (800) 762-4000 or
(+1) 203-925-4602
www.perkinelmer.com



For a complete listing of our global offices, visit www.perkinelmer.com/lasoffices

©2003 PerkinElmer, Inc. All rights reserved. The PerkinElmer logo and design are registered trademarks and LAMBDA is a trademark of PerkinElmer, Inc. All other trademarks not owned by PerkinElmer, Inc. or its subsidiaries that are depicted herein are the property of their respective owners. PerkinElmer reserves the right to change this document at any time and disclaims liability for editorial, pictorial or typographical errors.