# Application Note

UV-0007

## PIV-756/PIN-757 Horizontal Integrating Sphere

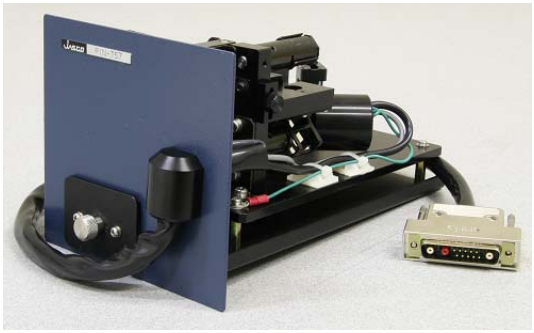

Figure 1: The horizontal Integrating sphere

The model PIV-756/PIN-757 Horizontal Integrating sphere (Figure 1) is an accessory for the V-600 series spectrophotometers (V-650/660/670) for measurement of the diffuse transmittance and reflectance of samples. Using a simple horizontal positioning of samples, placement of uneven or irregular samples can be visually determined. The horizontal integrating sphere accessory offers precise measurement and increases the operating efficiency even for amorphous samples and samples that can not be placed vertically.

To demonstrate the capabilities of this accessory, a sample that cannot be placed vertically, such as a contact lens, is examined using the horizontal integrating sphere.

### Measurement with a Conventional Integrating Sphere

To measure a contact lens with a horizontal integrating sphere, one of the possible measurement methods is to hold the sample in a saline solution by placing it between two quartz plates (Figure 2).
With this measurement method, air bubbles in the cell and deformation of the lens may prevent precise measurements of the sample. Also, the vertical placement of the sample makes the determination of the desired measurement area very difficult. Moreover, hard contact lenses may crack or be damaged when placing the lens between the quartz plates.

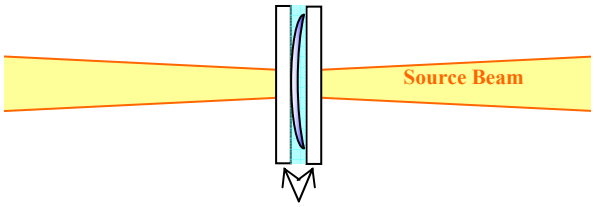


Figure 2: Contact lens between quartz plates

### Measurement with the Horizontal Integrating Sphere

With the horizontal integrating sphere, samples are horizontally placed on the integrating sphere. It is not necessary to contain the contact lens within quartz plates. A dedicated sample holder was prepared by using a quartz cell. With its circular design, a contact lens can be held in the appropriate solution during analysis.

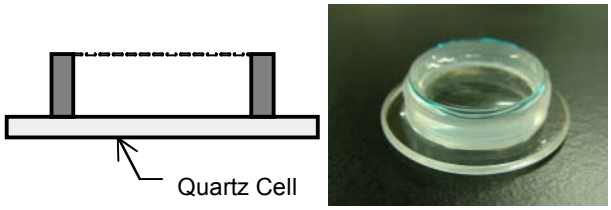


Fig.3 Dedicated holder for contact lens

The net transmittance of the sample can be obtained by measuring a blank with the lens holder filled with the preservative solution. This blank measurement cancels any stray light reflected by the surfaces of the sample holder and the lens solution.



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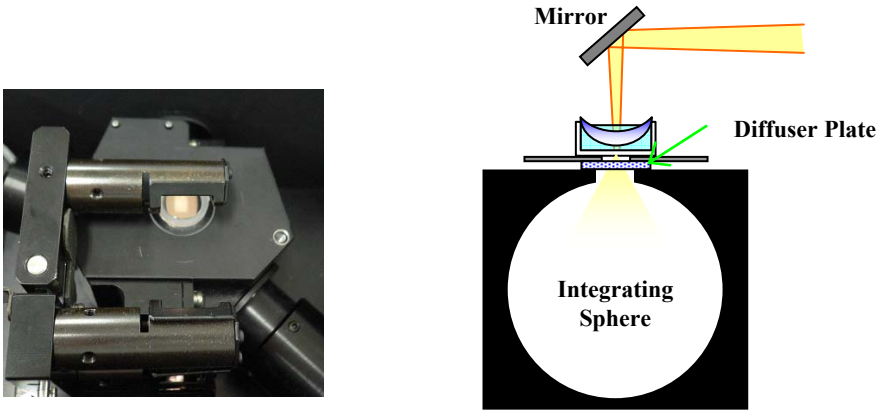
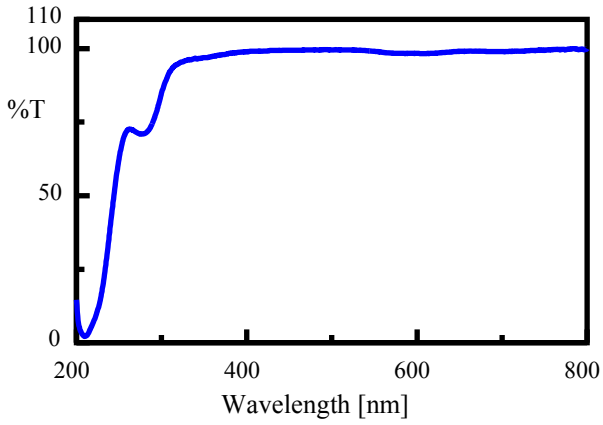



Figure 4: Sample placed on the horizontal integrating sphere

As shown in Figure 4, the sample holder with the sample solution was placed on the integrating sphere. With the horizontal integrating sphere, the sample can be easily observed such that a specific measurement area can be selected. Hard contact lenses can also be measured with no physical stress on the lens sample.




**Applications of the Horizontal Integrating Sphere**

As the example demonstrates, the horizontal integrating sphere is the best accessory for samples that can not be measured with vertical placement. This accessory offers easy measurements for small or amorphous samples as well as samples that can not be set vertically. Since the sample is placed on the top of the accessory, it can be measured while avoiding sample damage and also provide precise sample measurement of sample areas by simple visual examination of the specific area to be measured.



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