



Visible Light Transmission

Overview:

The light transmission properties of a polymer are crucial to its success in an ophthalmic application. It is vital that a lens exhibits a maximum transmission throughout the visible portion of light so that colours are easily distinguishable. The light transmission properties of a contact lens can be measured using the procedure outlined in the following standard.

ISO 18369-3 Ophthalmic optics - Contact lenses - Part 3: Measurement methods.

Specifically this is concerned with section 4.6 Determinations of the spectral and luminous transmittance. The measurement is performed using a spectrophotometer that is fully integrating and can provide a light transmittance value over a range of wavelengths. The instrument must have a bandwidth of 10nm or less throughout the measurement range. The measurement of transmittance of contact lenses is performed in saline solution. Thus the measured value represents the performance of the lens in-vivo by simulating light losses due to reflection at the lens/tear layer interface by a lens/saline solution interface.

Procedure:

Contact lenses and saline solution have similar densities. Therefore a special cuvette is helpful for positioning the contact lens perpendicular to the incident parallel beam during the measurement. The contact lens is positioned into a cuvette which is able to keep the lens in a fixed position at the exact height that the incident beam passes through the cuvette. The lens is held in place sufficiently so that it does not float during the measurement.

The measurement is performed with the contact lens in a fully hydrated state whilst immersed in saline. The parallel incident beam has a diameter of approximately 6mm. The measurement is performed between the wavelengths of 380-780nm, which covers the entire visible spectrum. It is also possible to investigate the ability of the material to absorb UV light if a UV absorber is present in the material. This is achieved by expanding the measurement range to 200-780nm thus including the UV range of the electromagnetic spectrum.