

Applications Note

AN 1066

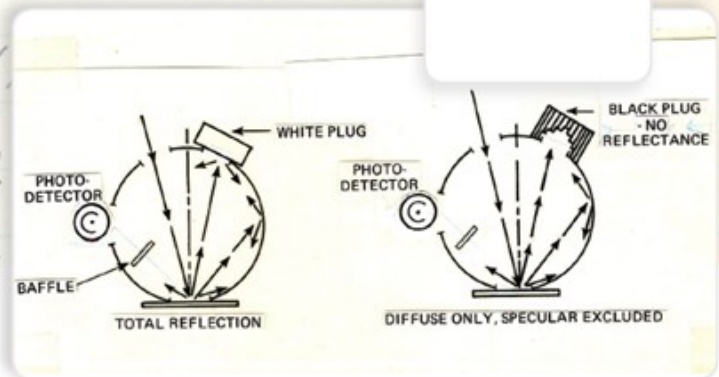
$\Delta = 2t + \frac{\lambda}{2}$ (must equal a whole number of λ for a bright fringe or

$$n\lambda = 2t + \frac{\lambda}{2}$$

$$t = \frac{n\lambda - \frac{\lambda}{2}}{2} = \frac{\lambda}{2} \left(n - \frac{1}{2} \right)$$

substituting

$$D^2 = 2s \left[\frac{\lambda}{2} \left(n - \frac{1}{2} \right) \right]$$

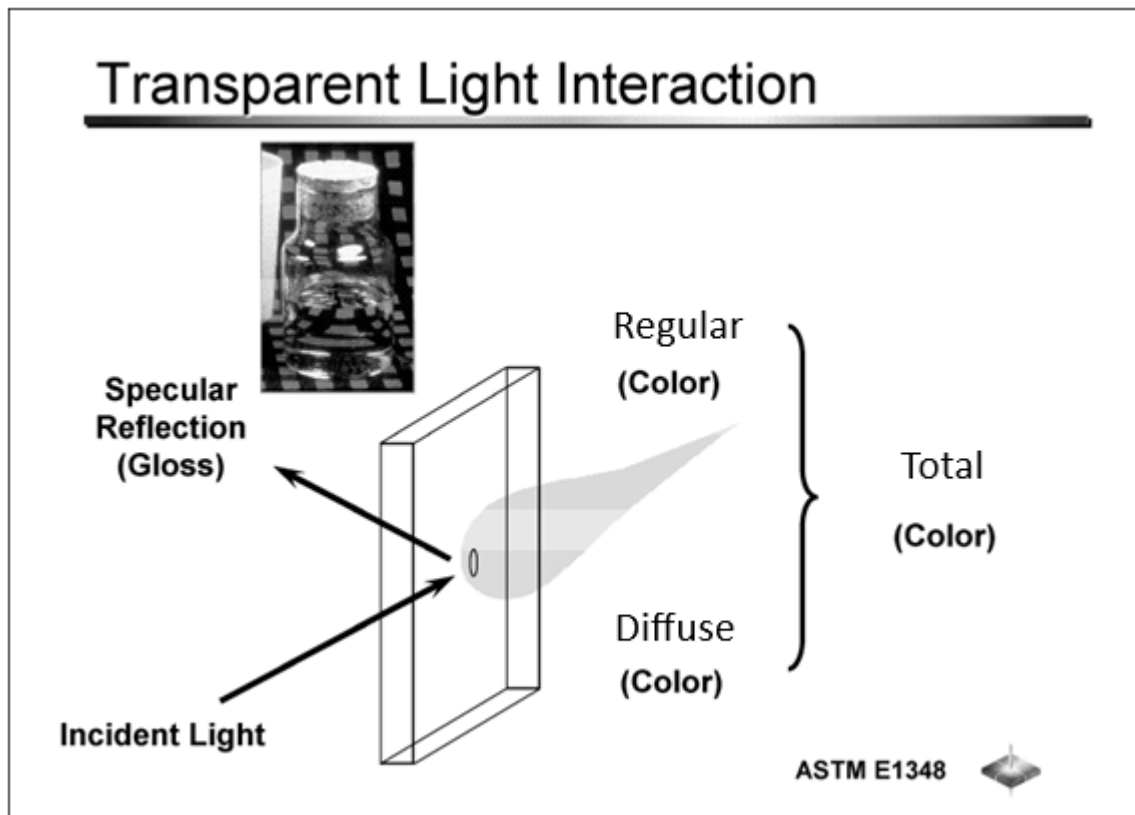


RTRAN vs TTRAN

Sample characteristics dictate the type of Transmittance Measured.

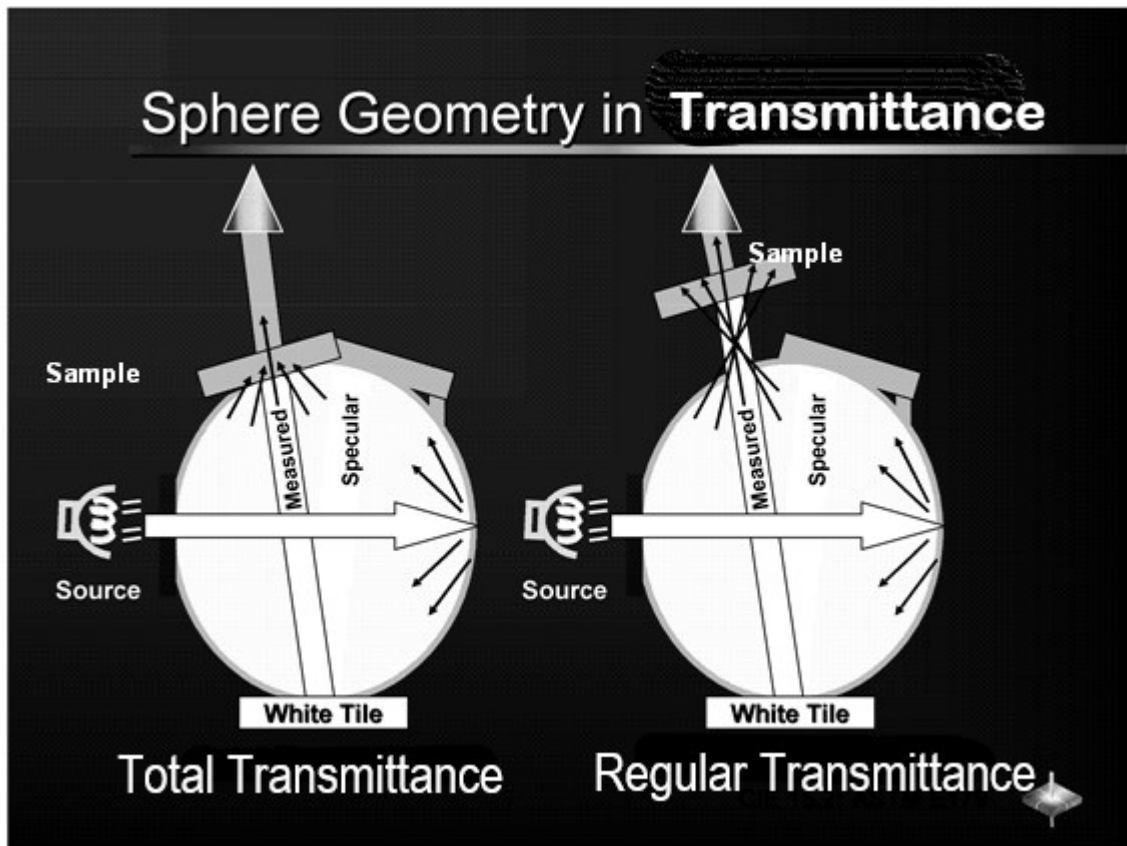
Abstract

For transparent materials, gloss is seen in the specular reflection. Color is seen primarily in the **regular transmittance** that passes without deviation through the transparent material, modified by the absorption of the colorants. The presence of internal scattering centers such as scratches, cloudiness, bubbles, or suspended particles within the material or the surface texture can cause the regular transmittance signal to scatter or diffuse. This **diffuse transmittance** also contains a secondary color component of the material and is responsible for any hazy or cloudy appearance. Clear, transparent materials generally have little or no diffuse transmittance.



Most sphere instruments are constructed in the inverse $d/8^\circ$ geometry (diffuse illumination/ 8° viewing). In this configuration, total transmittance (TTRAN), which includes both the regular and the diffuse (scattered) components of the transmitted light, is measured with the sample situated at the sphere side of the transmittance compartment. Regular transmittance (RTRAN) is measured with the sample situated at the lens, including only the transmitted light that comes straight through the sample. Diffuse transmittance is calculated as total transmittance minus regular transmittance.

$$\text{Diffuse Transmittance} = \text{Total Transmittance} - \text{Regular Transmittance}$$



TTRAN measurements are recommended for samples that are slightly hazy and have some internal light scattering. Brewed tea, fruit juices, and biopharma/chemical solutions are examples of samples that require TTRAN measurements due to scattering. RTRAN measurements are used for clear (non-hazy, non-scattering) samples.

The HunterLab instruments that are capable of measuring diffuse, regular, and total transmittance are the Vista, UltraScan PRO, and UltraScan VIS.

About HunterLab

HunterLab is the technology leader in color measurement solutions, providing instruments, software, knowledge and service to a wide variety of industries. With over 5 decades of experience in more than 65 countries, HunterLab applies our leading edge technology to your products helping you measure and communicate color simply and effectively.

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