

The Haze Value Measurement System using a UV-Visible Spectrophotometer

Introduction

The haze value of a transparent sample describes the amount of light scattered when light passes through the sample. The lower the haze value, the higher the clarity of the sample indicating less impurities.

In this application note, the haze value and total light transmittance in diffuser panels is reported, using measurement methods based on JIS, ISO, and ASTM standard procedures.



V-670

UV-Visible Spectrophotometer



Keywords

V-650/660/670, UV-Visible/NIR, Haze, Diffuse transmittance, Materials, Integrating sphere

Experimental

Figure 1 illustrates how the total transmittance (T_t), sample diffusion rate (T_d), and scattering rate (T_s) are obtained using an integrating sphere. The baseline spectrum is obtained using a white diffuser plate (1) and the light scattered by the instrument itself is measured (T_s) in order to calibrate the spectrophotometer.

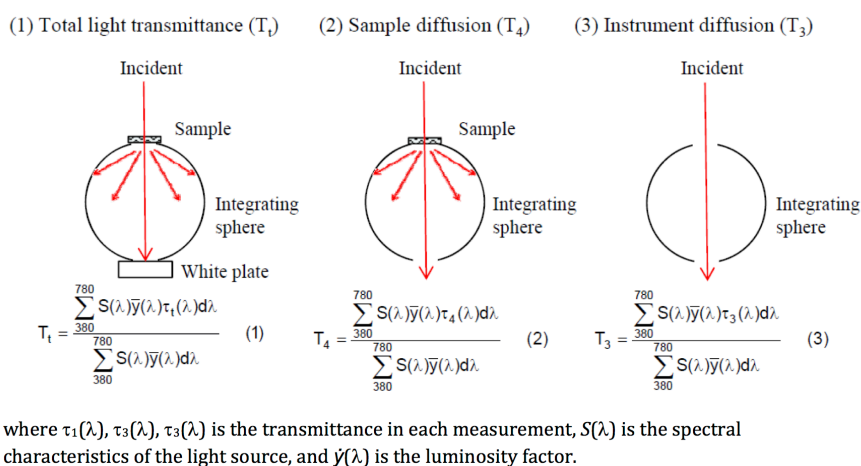


Figure 1. Haze value measurement setup and equations.

The total light transmittance and sample diffusion of the sample is then measured and the haze value is calculated by the ratio of the two spectra:

$$Haze = \frac{T_d}{T_t}$$

Measurement Conditions			
Bandwidth	5 nm	Scan speed	400 nm/min
Response	0.24 sec	Data interval	1 nm
Light Source	D65	View angle	2°

Results

The spectrum of the total light transmittance (τ_t) and the sample diffusion rate (τ_d) of the quartz diffuser plates are shown in Figure 2. The calculated haze values are shown in Table 1. The spectra and haze values clearly indicate a difference in samples 3, 4, 5, and 6.

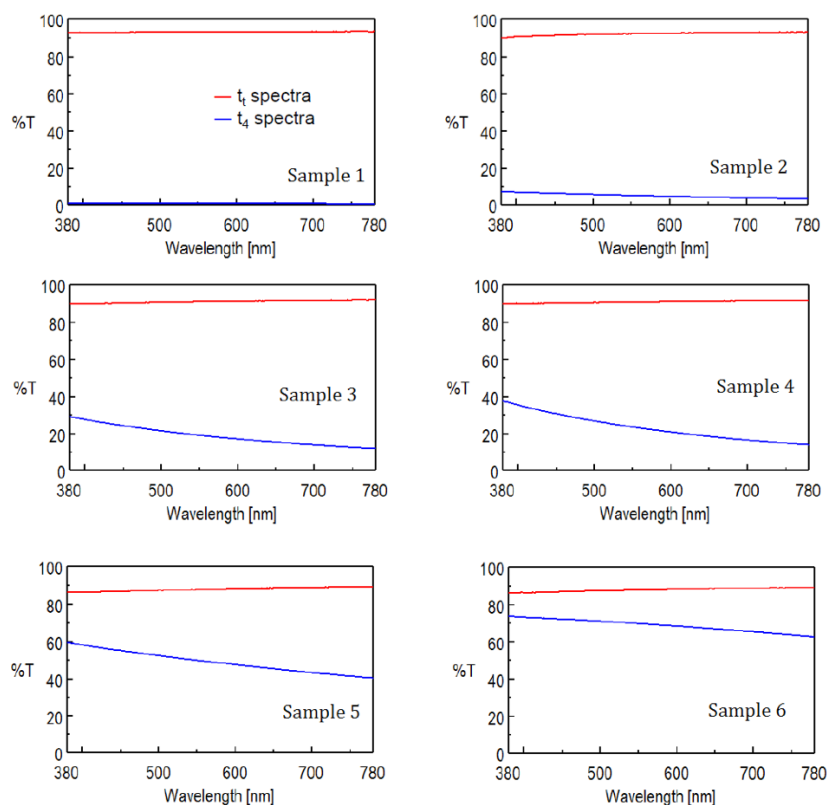


Figure 2. Transmittance spectra of six diffuser plate samples.

Table 1. Calculated haze values for diffuser panels.

	T_3 [%]	T_t [%]	T_4 [%]	T_d [%]	Haze [%]
1	0.08	93.06	0.71	0.63	0.7
2	0.08	92.13	4.94	4.86	5.3
3	0.08	90.88	18.7	18.62	20.5
4	0.08	90.8	23.12	23.04	25.4
5	0.08	87.75	69.34	69.27	78.9
6	0.08	85.46	70.56	70.49	82.5