



Measurement of light and solar direct transmittance using the Model UH5700 spectrophotometer

The Model UH5700 spectrophotometer is a desktop spectrophotometer that can measure the transmittance, reflectance, and absorbance of liquid and solid samples in the wavelength range of 190 to 3300 nm. We have introduced new “UV Solutions Plus” software (Figure 1) to improve user friendliness. The model UH5700 can be now used to measure the visible light and solar transmittance of glass in conformity with JIS R 3106.¹⁾



Model UH5700 Spectrophotometer

¹⁾ JIS R 3106 Testing method for transmittance, reflectance, emissivity of flat glass and calculation of total solar energy transmittance of glazing

Measurement of visible light and solar transmittance

- ✓ The Model UH5700 spectrophotometer was equipped with a glass filter holder to measure the transmission spectrum of three types of glass (Figure 2).
- ✓ The test method for flat glass is specified in JIS R 3106, and the visible light transmittance (wavelength 380 to 780 nm) and solar direct transmittance (wavelength 300 to 2500 nm) are calculated by multiplying the measured transmission spectra by weighting factors and taking the weighted average.²⁾
- ✓ Much higher values for both types of transmittance were obtained for sample A than for samples B and C, and it can be seen that light readily passes through sample A (Table 1). In addition, the solar transmittance for sample B was lower than its visible light transmittance. This is particularly true in the near-infrared region.

²⁾ See JIS R 3106 for the detailed calculation method.

■ Accessory device

Glass filter holder (P/N: 210-2109)

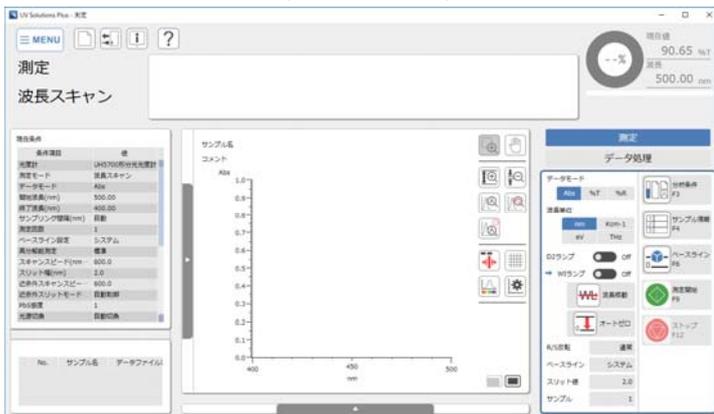


Figure 1 - Measurement screenshot (control software: UV Solutions Plus)

■ Measurement conditions

- Scan speed: 300 nm/min (UV-Vis), 1000 nm/min (NIR)
- Slit: 5 nm (UV-Vis), automatic (NIR)
- PbS sensitivity: 2
- Sampling interval: 1 nm

■ Formula for computation

$$\text{Visible light transmittance } \tau_v = \frac{\sum_{\lambda} D\lambda \cdot V\lambda \cdot \tau_t(\lambda)}{\sum_{\lambda} D\lambda \cdot V\lambda}$$

$D\lambda \cdot V\lambda$: Weighting factors obtained from the spectral distribution of CIE daylight D_{65} and CIE light adaptation standard relative luminosity
 τ_t : Transmittance at each wavelength (%)

$$\text{Solar transmittance } \tau_e = \frac{\sum_{\lambda} E\lambda \cdot \Delta\lambda \cdot \tau_t(\lambda)}{\sum_{\lambda} E\lambda \cdot \Delta\lambda}$$

$E\lambda \cdot \Delta\lambda$: Weighting factors indicating the standard spectral distribution of solar radiation
 τ_t : Transmittance at each wavelength (%)

■ Transmittance spectra and calculation results

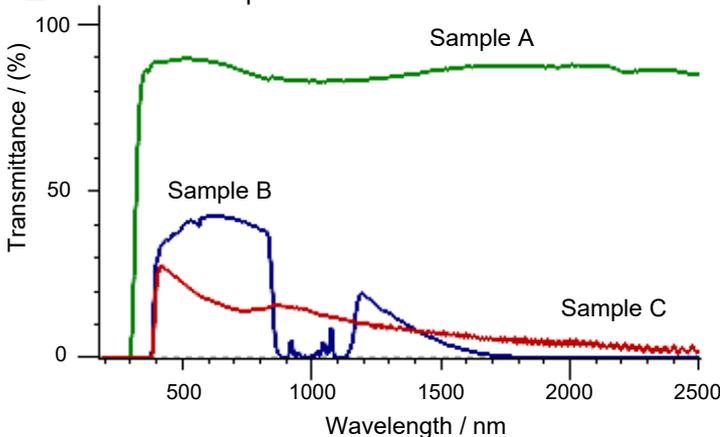


Figure 2 - Transmission spectrum of three types of glass

Table 1 - Calculation results for visible light and solar transmittance

	Light transmittance (%)	Solar direct transmittance (%)
Wavelength range	380 to 780 nm	300 to 2500 nm
Sample A	89.1	85.9
Sample B	40.6	24.6
Sample C	20.2	14.9

Note: The external appearance and specifications of the products mentioned in this technical report are subject to change for improvements. The data appearing in this document are for presenting an application example and are not a guarantee of performance.

[KEY WORDS]

spectrophotometer, UH5700, glass, visible light transmittance, solar transmittance, JIS R 3106