



GAMMA SCIENTIFIC

Light Measurement Solutions

191 Series Thin Film Measurement Heads

Specifications		
191 Optical Head	191F-10	191F-45
Measurement Type	Specular Reflection	Specular Reflection
Sample Types	Glass Plastic Metal Any polished substrate	Glass Plastic Metal Any polished substrate
Illumination Angle	10°	45°
Viewing Angle	10°	45°
Minimum Sample Thickness	0.5mm (transparent samples) None (opaque samples)	0.15mm (transparent samples) None (opaque samples)
Maximum Sample Thickness	None	None
Minimum Sample Size	2.0in (50mm) diameter or 1.75 x 1.75in (45 x 45mm) square	2.0in (50mm) diameter or 1.75 x 1.75in (45 x 45mm) square
Spectral Range	365nm-1100nm	365nm-1100nm
Illumination Spot Size (Area of Analysis)	1mm x 10µm	1mm x 10µm
Measurement Speed (Sample Dependent)	300-3000ms	300-3000ms
Calibration Reference Standard	6in (150mm) BK-7 Polished Glass	6in (150mm) BK-7 Polished Glass
Optical Head Dimensions	Height: 9in (230mm) Width: 6in (150mm) Depth: 6in (150mm) Weight: 3.5 lbs (1.6kg)	Height: 9in (230mm) Width: 6in (150mm) Depth: 6in (150mm) Weight: 3.5 lbs (1.6kg)
Accuracy ¹		
Spectral Reflectance ²	± 0.2%	± 0.2%
Tristimulus (CIE 1931 X, Y, Z)	± 0.05	± 0.05
Chromaticity (CIE 1931 x, y)	± 0.002	± 0.002
LAB Color (CIE 1976 L*, a*, b*)	L* ± 1.0 a*, b* ± 0.8	L* ± 1.0 a*, b* ± 0.8
Average Reflectance	± 0.1	± 0.1
Reported Parameters		
Spectral Data	Reflectance as a function of wavelength	Reflectance as a function of wavelength
Colorimetric Data	Tristimulus 1931 X, Y, Z Tristimulus 1964 X, Y, Z CIE 1931 x, y UCS 1960 u, v UCS 1976 u, v CIE 1976 L*, a*, b* CIE 1976 L*, u*, v*	Tristimulus 1931 X, Y, Z Tristimulus 1964 X, Y, Z CIE 1931 x, y UCS 1960 u, v UCS 1976 u, v CIE 1976 L*, a*, b* CIE 1976 L*, u*, v*
Wavelength Data	Dominant Wavelength Peak Wavelength	Dominant Wavelength Peak Wavelength

1: Accuracy specifications assume sufficient signal to noise and are valid immediately after proper calibration, relative to the calibration standard.
 2: Absolute accuracy across the entire spectrum. Reflectance is measured on a percent scale.