

RazorEdge Specifications

Properties apply to all long-wave-pass and short-wave-pass edge filters unless otherwise noted

Property	Specification		Comment
Edge Steepness (typical)	"E-grade"	0.2% of laser wavelength	Measured from OD 6 to 50%; Up to 0.8% for 248-300 nm filters and 3.3% for 224 nm filter
	"U- & S-grades"	0.5% of laser wavelength	
Blocking at Laser Wavelength		> 6 OD	OD = $-\log_{10}$ (transmission)
Transition Width	"E-grade"	< 0.5% of laser wavelength	Measured from laser wavelength to 50% transmission wavelength; < 4.5% for 224 nm filter
	"U-grade"	< 1% of laser wavelength	
	"S-grade"	< 2% of laser wavelength	
Guaranteed Passband Transmission		> 93%	Except > 90% for 224 - 325 nm filters; Averaged over the Passband
Typical Passband Transmission		> 98%	
Angle of Incidence		0.0° ± 2.0°	Range for above optical specifications
Cone Half Angle		< 5°	Rays uniformly distributed about 0°
Angle Tuning Range ⁽¹⁾		– 0.3% of Laser Wavelength (-1.6 nm or + 60 cm ⁻¹ for 532 nm filter)	Wavelength "blue shift" attained by increasing angle from 0° to 8°
Laser Damage Threshold		0.5 J/cm ² @ 266 nm 1 J/cm ² @ 532 nm	10 ns pulse width Tested for 266 and 532 nm filters only
Clear Aperture		≥ 22 mm (or ≥ 45 mm)	
Outer Diameter		25.0 + 0.0 / – 0.1 mm (or 50.0 + 0.0 / -0.1 mm)	Black-anodized aluminum
Overall Thickness		3.5 ± 0.1 mm	Black-anodized aluminum
Beam Deviation		≤ 10 arc seconds	

⁽¹⁾ For small angles (in degrees), the wavelength shift near the laser wavelength is $\Delta\lambda$ (nm) = $-5.0 \times 10^{-5} \times \lambda_L \times \theta^2$ and the wavenumber shift is Δ (wavenumbers) (cm⁻¹) = $500 \times \theta^2 / \lambda_L$, where λ_L (in nm) is the laser wavelength.

Dichroic Beamsplitter Specifications

Property	Specification		Comment
Edge Steepness (typical)		0.5% of laser wavelength (2.5 nm or 90 cm ⁻¹ for 532 nm filter)	Measured from 5% to 50% transmission for light with average polarization
Transition Width	"U-grade"	< 1% of laser wavelength	Measured from laser wavelength to 50% transmission wavelength for light with average polarization
	"S-grade"	< 2% of laser wavelength	
Reflection at Laser Wavelength		> 98% (s-polarization) > 90% (p-polarization)	
Average Passband Transmission		> 90%	Averaged over the Passband
Dependence of Wavelength on Angle of Incidence (Edge Shift)		0.35% / degree	Linear relationship valid between about 40° & 50°
Cone Half Angle (for non-collimated light)		< 0.5°	Rays uniformly distributed and centered at 45°
Size of Round Dichroics	Clear Aperture	≥ 22 mm	
	Outer Diameter	25.0 + 0.0 / – 0.1 mm	Black-anodized Aluminum
	Overall Thickness	3.5 ± 0.1 mm	Black-anodized Aluminum
Size of Rectangular Dichroics	Clear Aperture	> 80%	Elliptical
	Size	25.2 mm x 35.6 mm (± 0.1 mm)	
	Thickness	2.0 ± 0.1 mm	
Wedge Angle		≤ 20 arc seconds	
Flatness		Reflection of a collimated, gaussian laser beam with waist diameter up to 3 mm causes less than one Rayleigh Range of focal shift after a focusing lens.	

General Specifications (all RazorEdge filters)

Property	Specification	Comment
Coating Type	"Hard" ion-beam-sputtered	
Reliability and Durability	Ion-beam-sputtered, hard-coated technology with epoxy-free, single-substrate construction for unrivaled filter life. RazorEdge filters are rigorously tested and proven to MIL-STD-810F and MIL-C-48497A environmental standards.	
Transmitted Wavefront Error	< $\lambda/4$ RMS at $\lambda = 633$ nm	Peak-to-valley error < 5 x RMS measured within clear aperture
Surface Quality	60-40 scratch-dig	
Temperature Dependence	< 5 ppm / °C	
Substrate Material	Ultra-low autofluorescence fused silica (NBK7 or equivalent for LP01 filters)	
Filter Orientation	For mounted filters, arrow on ring indicates preferred direction of propagation of transmitted light. For rectangular dichroics, reflective coating side should face toward light source and sample	