

Continuously Variable filter set for the range 365 nm to 815 nm

This filter set consists of three continuously variable filters: a long-wavelength-pass filter, a short-wavelength-pass filter, and a dichroic. CVLWP 365-785 (LF104558) can be combined with CVSWP 395-815 (LF104557) to make a continuously variable bandpass filter for the range 365 nm to 815 nm.

The Exponentially Variable Dichroic, EVDichroic 360 nm - 860 nm (LF104556), is a long-wavelength-pass type dichroic whose edge can be tuned from 360 nm to 860 nm. It can be combined with sets of the CVLWP 365-785 and CVSWP 395-815, for, e.g., fluorescence measurements. The EVDichroic's dependence on position is non-linear by design which improves its performance for divergent beams by compensating for the coating's dependence on the angle of incidence.

Filter set specifications

λ_{center} tuning range	Minimum bandwidth	Maximum bandwidth	Out of band Blocking	Product numbers
380 – 800 nm	8 – 16 nm	79 – 120 nm	OD5.4	LF104557, LF104558

Detailed data for the three filters in this set are given below.

CVLWP 365-785 (LF104558)

Continuously variable long-wavelength-pass filter with $\lambda_{50\%}$ travelling from ≤ 365 nm to ≥ 785 nm within ≤ 84 nm

Near-edge average transmittance

T_{avg}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 85\%$	365 nm – 420 nm	$1.01 * \lambda_{50\%}$	$1.1 * \lambda_{50\%}$
$\geq 90\%$	420 nm – 785 nm	$1.01 * \lambda_{50\%}$	$1.1 * \lambda_{50\%}$

Broad-band average transmittance

T_{avg}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 89\%$	365 nm – 420 nm	$1.02 * \lambda_{50\%}$	$1.45 * \lambda_{50\%}$
$\geq 89\%$	420 nm – 785 nm	$1.02 * \lambda_{50\%}$	$1.55 * \lambda_{50\%}$, or 900 nm (whichever is smallest)

Broad-band minimum transmittance

T_{min}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 83\%$	365 nm – 420 nm	$1.02 * \lambda_{50\%}$	$1.45 * \lambda_{50\%}$
$\geq 83\%$	420 nm – 785 nm	$1.02 * \lambda_{50\%}$	$1.55 * \lambda_{50\%}$, or 900 nm (whichever is smallest)

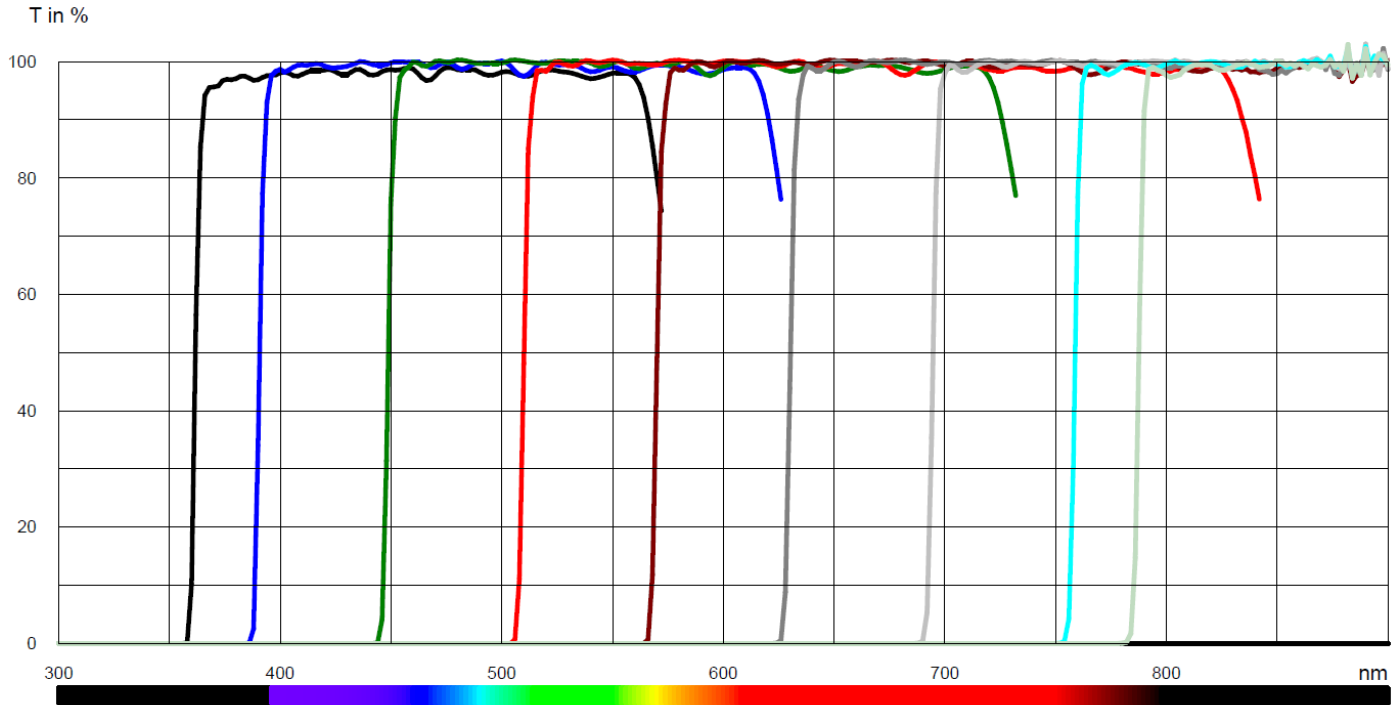
Broad-band blocking (maximum transmittance)

T_{max}	$\lambda_{50\%}$	Interval start	Interval end
$\leq 0.1\%$	365 nm – 785 nm	330 nm	$0.995 * \lambda_{50\%}$
$\leq 1\%$	365 nm – 785 nm	330 nm	$0.99 * \lambda_{50\%}$
$\leq 10\%$	365 nm – 785 nm	330 nm	$0.97 * \lambda_{50\%}$

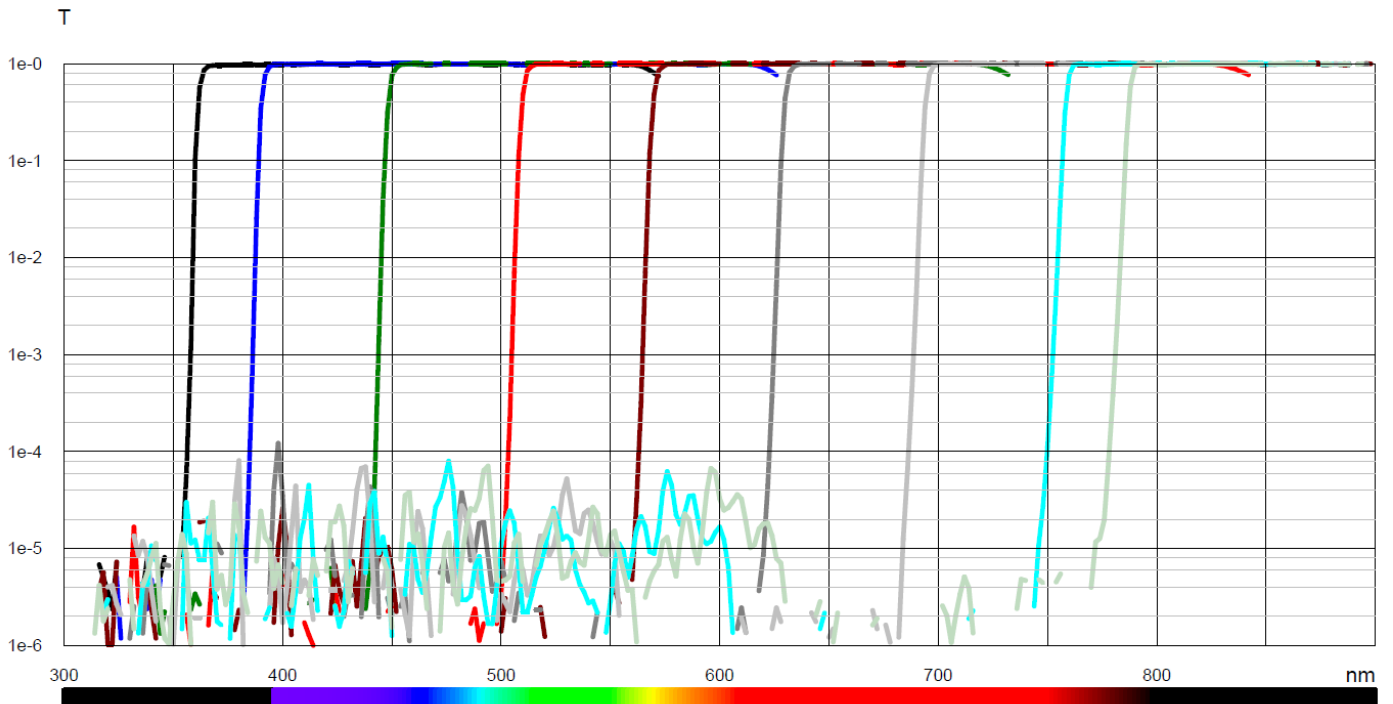
Broad-band blocking (average transmittance)

T_{avg}	$\lambda_{50\%}$	Interval start	Interval end
$\leq 0.05\%$	365 nm – 785 nm	330 nm	$0.97 * \lambda_{50\%}$

Typically measured transmittance of CVLWP 365-785 (LF104558)



Typically measured blocking of CVLWP 365-785 (LF104558)



CVSWP 395-815 (LF104557)

Continuously variable short-wavelength-pass filter with $\lambda_{50\%}$ travelling from ≤ 395 nm to ≥ 815 nm within ≤ 84 nm

Near-edge average transmittance

T_{avg}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 83\%$	395 nm – 430 nm	$0.95 * \lambda_{50\%}$	$0.99 * \lambda_{50\%}$
$\geq 88\%$	430 nm – 520 nm	$0.95 * \lambda_{50\%}$	$0.99 * \lambda_{50\%}$
$\geq 90\%$	520 nm – 815 nm	$0.95 * \lambda_{50\%}$	$0.99 * \lambda_{50\%}$

Broad-band average transmittance

T_{avg}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 85\%$	395 nm – 430 nm	$0.49 * \lambda_{50\%} + 147$ nm	$0.98 * \lambda_{50\%}$
$\geq 87\%$	430 nm – 520 nm	$0.49 * \lambda_{50\%} + 147$ nm	$0.98 * \lambda_{50\%}$
$\geq 90\%$	520 nm – 815 nm	$\lambda_{50\%} - 120$ nm	$0.98 * \lambda_{50\%}$

Broad-band minimum transmittance

T_{min}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 80\%$	395 nm – 430 nm	$0.49 * \lambda_{50\%} + 147$ nm	$0.98 * \lambda_{50\%}$
$\geq 85\%$	430 nm – 520 nm	$0.49 * \lambda_{50\%} + 147$ nm	$0.98 * \lambda_{50\%}$
$\geq 87\%$	520 nm – 640 nm	$\lambda_{50\%} - 120$ nm	$0.98 * \lambda_{50\%}$
$\geq 88\%$	640 nm – 815 nm	$\lambda_{50\%} - 120$ nm	$0.98 * \lambda_{50\%}$

Extended, broad-band average transmittance

T_{avg}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 85\%$	520 nm – 640 nm	$0.49 * \lambda_{50\%} + 147$ nm	$\lambda_{50\%} - 120$ nm
$\geq 85\%$	640 nm – 815 nm	$0.29 * \lambda_{50\%} + 278$ nm	$\lambda_{50\%} - 120$ nm

Extended, broad-band average transmittance

T_{min}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 80\%$	520 nm – 640 nm	$0.49 * \lambda_{50\%} + 147$ nm	$\lambda_{50\%} - 120$ nm
$\geq 80\%$	640 nm – 815 nm	$0.29 * \lambda_{50\%} + 278$ nm	$\lambda_{50\%} - 120$ nm

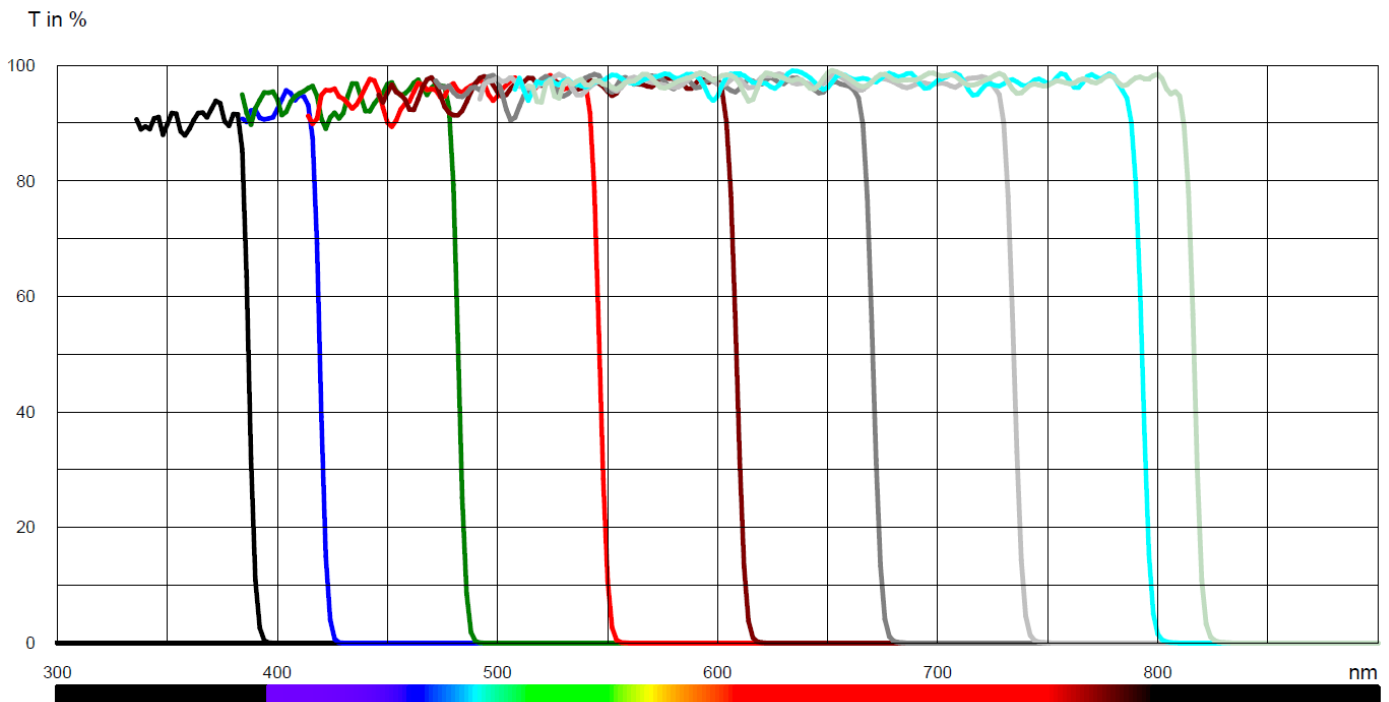
Broad-band blocking (maximum transmittance)

T_{max}	$\lambda_{50\%}$	Interval start	Interval end
$\leq 0.2\%$	395 nm – 815 nm	$1.025 * \lambda_{50\%}$	$1.4 * \lambda_{50\%} + 220$ nm, or 900 nm (whichever is smaller)
$\leq 1\%$	395 nm – 815 nm	$1.02 * \lambda_{50\%}$	$1.45 * \lambda_{50\%} + 220$ nm, or 900 nm (whichever is smaller)
$\leq 10\%$	395 nm – 815 nm	$1.015 * \lambda_{50\%}$	$1.45 * \lambda_{50\%} + 220$ nm, or 900 nm (whichever is smaller)

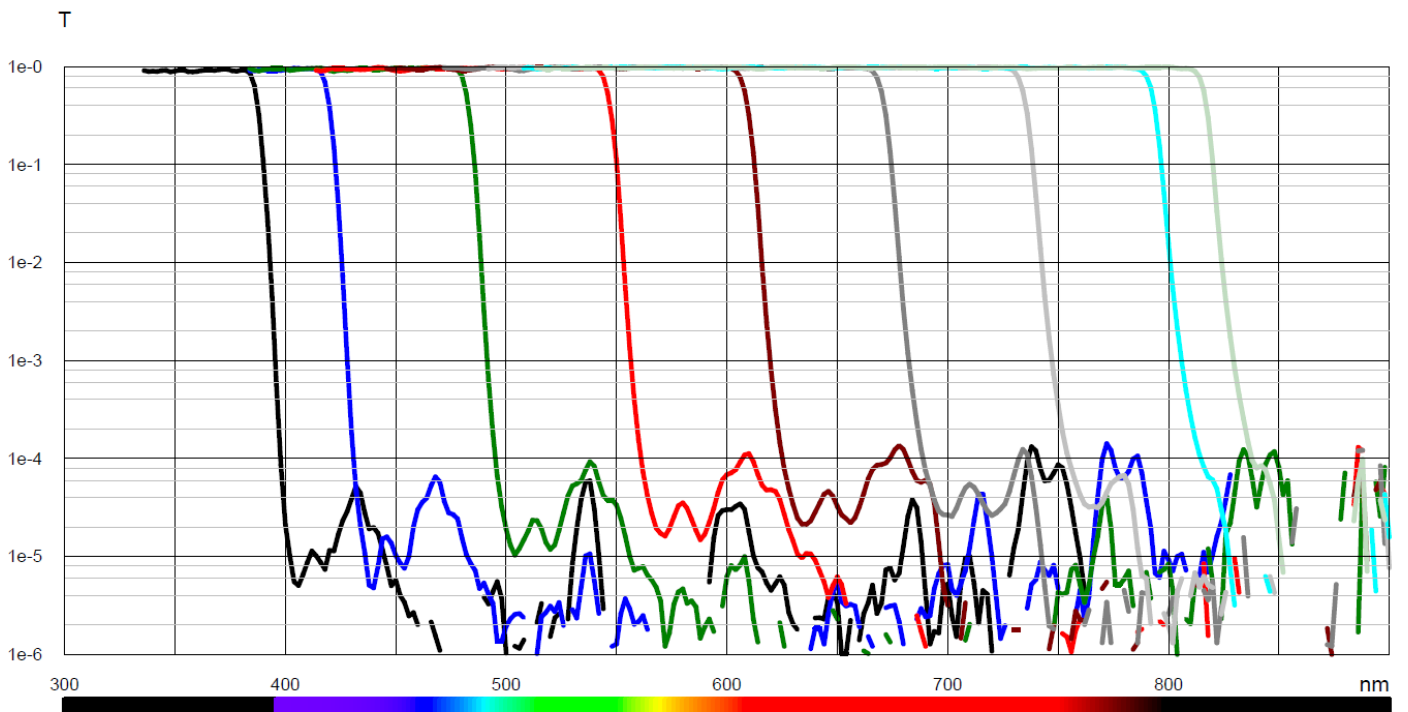
Broad-band blocking (average transmittance)

T_{avg}	$\lambda_{50\%}$	Interval start	Interval end
$\leq 0.02\%$	395 nm – 815 nm	$1.03 * \lambda_{50\%}$	$1.4 * \lambda_{50\%} + 220$ nm, or 900 nm (whichever is smaller)

Typically measured transmittance of CVSWP 395-815 (LF104557)



Typically measured blocking of CVSWP 395-815 (LF104557)



EVDichroic 360-860 (LF104556)

Exponentially variable long-wavelength-pass filter with $\lambda_{50\%}$ at AOI = 35° travelling from ≤ 360 nm to ≥ 860 nm within ≤ 92.6 mm.

A dielectrically coated dichroic is typically placed where the incident light is well-collimated. However, the EVDichroic 360-860 works for a divergent, point-like source for angles of incidence of 35° +/- 10°.

As for any other continuously variable filter, the EVDichroic 360-860 also works for a collimated beam.

Near-edge average transmittance at 35°, unpolarized light

T_{avg}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 87\%$	360 nm – 420 nm	$1.02 * \lambda_{50\%}$	$1.1 * \lambda_{50\%}$
$\geq 92\%$	420 nm – 860 nm	$1.02 * \lambda_{50\%}$	$1.1 * \lambda_{50\%}$

Broad-band average transmittance at 35°, unpolarized light

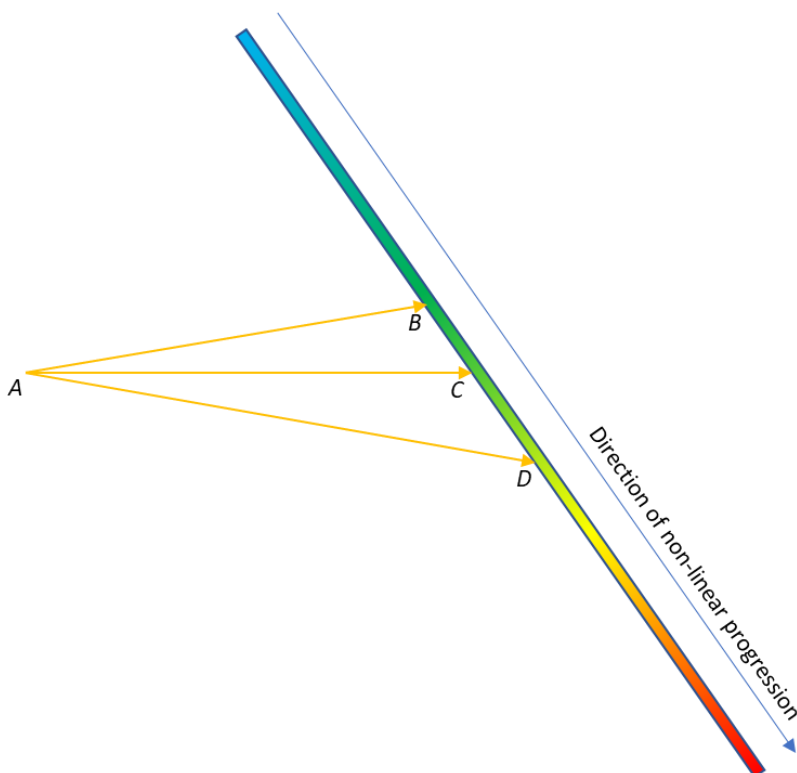
T_{avg}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 90\%$	360 nm – 860 nm	$1.03 * \lambda_{50\%}$	$1.8 * \lambda_{50\%} - 80$ nm, or 900 nm (whichever is smallest)

Broad-band minimum transmittance at 35°, unpolarized light

T_{min}	$\lambda_{50\%}$	Interval start	Interval end
$\geq 86\%$	360 nm – 545 nm	$1.03 * \lambda_{50\%}$	$1.45 * \lambda_{50\%}$
$\geq 88\%$	545 nm – 860 nm	$1.03 * \lambda_{50\%}$	$1.55 * \lambda_{50\%}$, or 900 nm (whichever is smallest)

Broad-band blocking (maximum transmittance) at 35°, unpolarized light

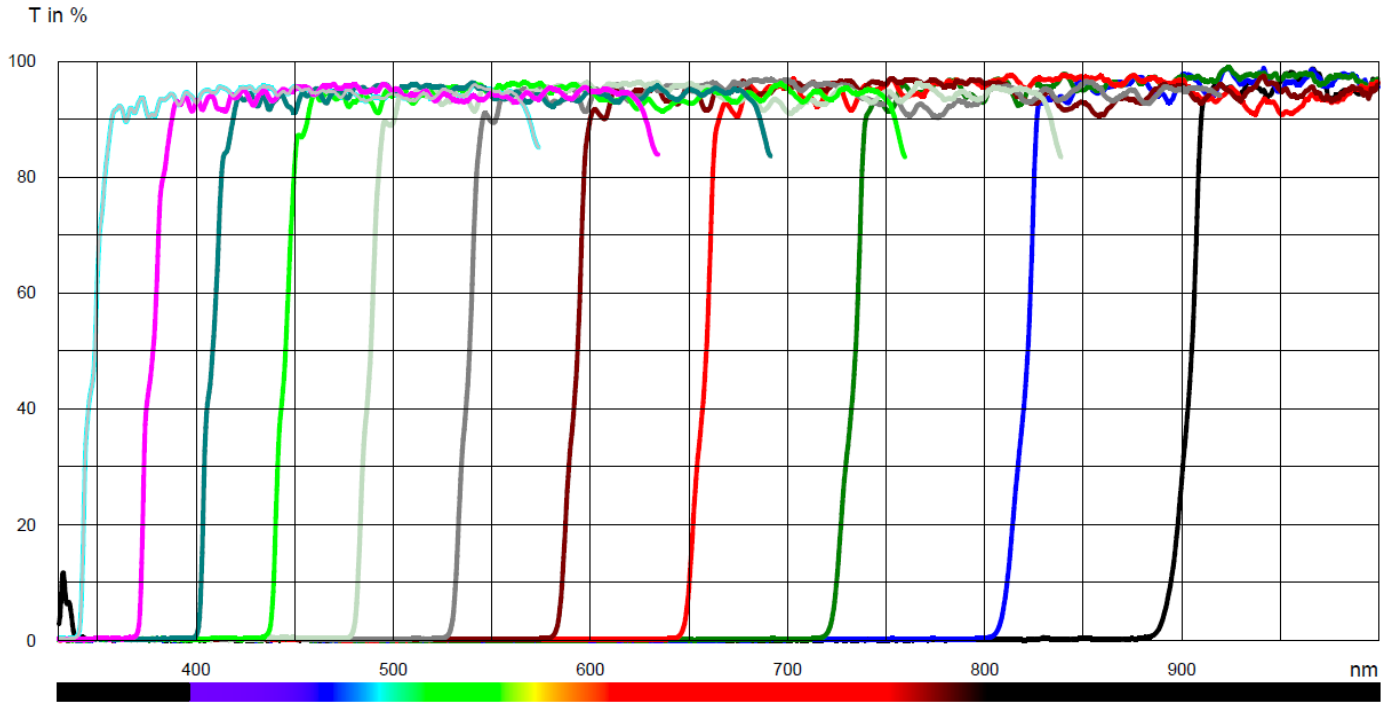
T_{max}	$\lambda_{50\%}$	Interval start	Interval end
$\leq 0.4\%$	360 nm – 860 nm	330 nm	$0.95 * \lambda_{50\%}$
$\leq 1\%$	360 nm – 860 nm	330 nm	$0.97 * \lambda_{50\%}$
$\leq 10\%$	360 nm – 860 nm	330 nm	$0.98 * \lambda_{50\%}$



Use with divergent, point-like source

- The source is at A, the angle of incidence at C is 35°.
- The distance AC should be approximately 12 mm.
- Then, at B and D, the edge wavelength at 25° and 45°, respectively, will be very close to that at point C at 35° because the non-linear progression compensates for the coating's dependence on angle of incidence around 35°.
- By shifting the dichroic in its variable direction, the edge wavelength at 35° shifts from 360 nm to 860 nm.
- Out of the shown plane, angles are between -10° and +10°. Around 0°, the coating depends very little on angle of incidence.

Typically measured transmittance of EVDichroic 360-860 (LF104556) at 35°, unpolarized light



Typically measured blocking of EVDichroic 360-860 (LF104556) at 35°, unpolarized light

