

Achromatic Doublets | AD



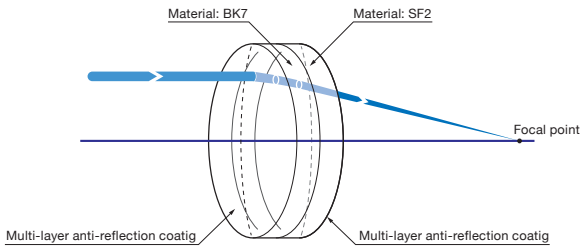
- Application Systems
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Achromatic doublets are cemented achromats made of two different lenses. (Low dispersion positive from crown glass and high dispersion negative from flint glass). The difference of dispersion and shape of both lenses are designed to minimize the chromatic aberrations in blue (486.1nm), green (546.1nm) and red (656.3nm). Therefore, these lenses are able to support the entire visible wavelength spectrum.

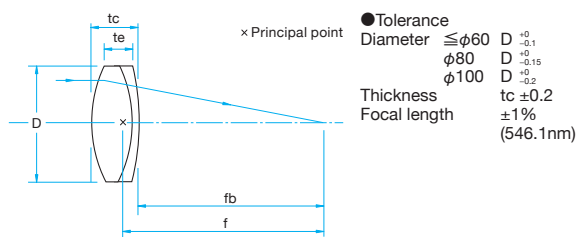
- Dispersion and shape differences are both effective to decrease spherical aberration. The spherical aberration of achromatic doublets is better than singlets and minimized at infinite conjugate ratios.
- Every product is coated on both surfaces with a broadband multi-layer anti-reflection coating for the visible wavelength (400 – 700nm).
- When a parallel beam is converged and to minimize the spherical aberration, please set the positive part to the side of the incident parallel beam and put the negative part to the side of the focal point.
- To change the refractive index of a glass according to a wavelength is called “dispersion of the glass” Having a difference in focal length of a lens at each wave length is Chromatic aberration and this is due to dispersion. This can be corrected by combining glasses with low and high dispersions. Spherical aberration is when a ray enters a lens farther from its optical axis and has a shorter focus than a paraxial focus.



Schematic



Outline Drawing (in mm)



Specifications

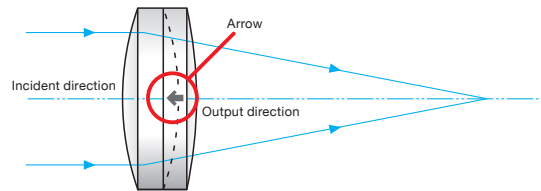
Material	BK7, SF2
Design wavelength	Blue: 486.1nm, Green: 546.1nm, Red: 656.3nm
Coating	Broadband multi-layer anti-reflection coating for the Visible
Cement	Ultraviolet Hardened Adhesive
Laser Damage Threshold	0.3J/cm ² (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	40-20
Clear aperture	90% of actual aperture

Guide

- ▶ Please contact our International Sales Division for customized achromatic doublets. (Customized on size etc.)
- ▶ Please refer to our web site for the lens design data.
[WEB Reference](#) [Catalog Code](#) W3075
- ▶ Also available is an air spaced type of focusing lens (YLFL/YLFDL). Designed for laser processing. [Reference](#) C149

Attention

- ▶ When a parallel beam is converged and to minimize the spherical aberration, please set the positive part to the side of the incident parallel beam and put the negative part to the side of the focal point.
- ▶ To change the refractive index of a glass according to a wavelength is called “dispersion of the glass” Having a difference in focal length of a lens at each wave length is Chromatic aberration and this is due to dispersion. This can be corrected by combining glasses with low and high dispersions.
- ▶ Spherical aberration is when a ray enters a lens farther from its optical axis and has a shorter focus than a paraxial focus.
- ▶ Be sure to wear laser safety goggles when checking optical path and adjusting optical axis.



Achromatic Doublets

AD

φ10 – φ25						
Part Number	Diameter D [mm]	Focal length f [mm]	Center Thickness tc [mm]	Edge Thickness te [mm]	Back focal length fb [mm]	Centration [']
AD-10-20PM	φ10	20.0	6.7	5.1	16.6	<1
AD-10-25PM	φ10	25.0	6.1	4.9	22.1	<1
AD-10-30PM	φ10	30.1	5.7	4.7	27.4	<1
AD-10-40PM	φ10	40.0	5.3	4.6	37.5	<1
AD-10-50PM	φ10	50.0	5.0	4.4	47.5	<1
AD-10-60PM	φ10	60.1	4.9	4.4	57.6	<1
AD-10-70PM	φ10	69.9	4.7	4.3	67.3	<1
AD-10-80PM	φ10	80.1	4.6	4.2	77.8	<1
AD-10-100PM	φ10	100.5	4.5	4.2	98.1	<1
AD-12.7-25PM	φ12.7	25.1	7.3	5.3	21.5	<1
AD-12.7-30PM	φ12.7	30.0	6.8	5.2	26.7	<1
AD-12.7-40PM	φ12.7	40.1	6.1	4.9	36.9	<1
AD-12.7-50PM	φ12.7	50.1	5.7	4.7	47.3	<1
AD-12.7-80PM	φ12.7	79.9	5.1	4.5	77.4	<1
AD-12.7-100PM	φ12.7	100.1	4.8	4.3	97.9	<1
AD-15-25PM	φ15	25.2	8.8	6.0	20.7	<1
AD-15-30PM	φ15	30.1	8.0	5.7	26.0	<1
AD-15-40PM	φ15	40.1	6.9	5.2	36.5	<1
AD-15-50PM	φ15	50.1	6.3	5.0	47.1	<1
AD-15-60PM	φ15	59.9	5.9	4.8	57.0	<1
AD-15-70PM	φ15	70.2	5.7	4.8	67.4	<1
AD-15-80PM	φ15	79.9	5.5	4.7	77.1	<1
AD-15-100PM	φ15	100.0	5.2	4.5	97.3	<1
AD-20-30PM	φ20	30.6	10.9	6.8	24.9	<1
AD-20-40PM	φ20	40.1	9.2	6.2	35.3	<1
AD-20-50PM	φ20	50.2	8.1	5.7	46.0	<1
AD-20-60PM	φ20	60.2	7.4	5.4	56.6	<1
AD-20-70PM	φ20	70.1	6.9	5.2	66.7	<1
AD-20-80PM	φ20	79.9	6.6	5.1	76.6	<1
AD-20-100PM	φ20	99.5	6.1	4.9	96.4	<1
AD-20-120PM	φ20	120.3	5.7	4.7	117.3	<1
AD-20-150PM	φ20	149.8	5.4	4.6	147.0	<1
AD-20-170PM	φ20	170.0	5.3	4.6	167.2	<1
AD-20-200PM	φ20	200.1	5.1	4.5	197.3	<1
AD-20-220PM	φ20	220.0	5.0	4.5	216.9	<3
AD-20-250PM	φ20	250.0	4.9	4.4	247.0	<3
AD-20-300PM	φ20	300.0	4.7	4.3	297.1	<3
AD-25-40PM	φ25	40.9	12.5	7.7	34.2	<1
AD-25-50PM	φ25	50.1	10.9	7.1	44.9	<1
AD-25-60PM	φ25	60.1	9.8	6.7	55.2	<1
AD-25-70PM	φ25	69.9	9.0	6.3	65.3	<1
AD-25-80PM	φ25	80.0	8.5	6.2	75.9	<1
AD-25-100PM	φ25	100.2	7.7	5.9	96.5	<1
AD-25-120PM	φ25	119.8	7.2	5.6	116.2	<1
AD-25-150PM	φ25	149.6	6.7	5.5	146.2	<1
AD-25-170PM	φ25	170.4	6.4	5.3	167.1	<1
AD-25-200PM	φ25	200.1	6.1	5.2	197.0	<1
AD-25-220PM	φ25	222.0	6.0	5.2	218.9	<1
AD-25-250PM	φ25	250.8	5.8	5.1	247.7	<1
AD-25-300PM	φ25	300.0	5.6	5.0	296.6	<3

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Compatible Optic Mounts

FLH-10S, -15S, -20S, -25S / ARLH-25

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φ25.4 – φ40						
Part Number	Diameter D [mm]	Focal length f [mm]	Center Thickness tc [mm]	Edge Thickness te [mm]	Back focal length fb [mm]	Centration [']
AD-25.4-50PM	φ25.4	50.1	10.9	7.0	44.9	<1
AD-25.4-60PM	φ25.4	60.1	9.8	6.6	55.2	<1
AD-25.4-70PM	φ25.4	69.9	9.0	6.2	65.3	<1
AD-25.4-80PM	φ25.4	80.0	8.5	6.1	75.9	<1
AD-25.4-100PM	φ25.4	100.2	7.7	5.8	96.5	<1
AD-25.4-120PM	φ25.4	119.8	7.2	5.6	116.2	<1
AD-25.4-150PM	φ25.4	149.6	6.7	5.4	146.2	<1
AD-25.4-170PM	φ25.4	170.4	6.4	5.3	167.1	<1
AD-25.4-200PM	φ25.4	200.1	6.1	5.1	197.0	<1
AD-25.4-220PM	φ25.4	222.0	6.0	5.1	218.9	<1
AD-25.4-250PM	φ25.4	250.8	5.8	5.0	247.7	<1
AD-25.4-300PM	φ25.4	300.0	5.6	5.0	296.6	<3
AD-30-50PM	φ30	50.3	14.1	8.6	43.5	<1
AD-30-60PM	φ30	60.3	12.6	8.1	53.9	<1
AD-30-70PM	φ30	70.8	11.5	7.7	65.0	<1
AD-30-80PM	φ30	80.3	10.7	7.4	75.0	<1
AD-30-100PM	φ30	100.7	9.5	6.8	96.0	<1
AD-30-120PM	φ30	120.1	8.8	6.6	115.7	<1
AD-30-150PM	φ30	150.0	8.1	6.3	146.0	<1
AD-30-170PM	φ30	169.9	7.7	6.1	166.0	<1
AD-30-200PM	φ30	200.2	7.3	6.0	196.4	<1
AD-30-220PM	φ30	220.2	7.1	5.9	216.5	<1
AD-30-250PM	φ30	249.7	6.9	5.8	246.1	<1
AD-30-300PM	φ30	300.4	6.6	5.7	296.9	<1
AD-30-350PM	φ30	350.0	6.4	5.6	346.2	<3
AD-30-400PM	φ30	400.0	6.2	5.5	396.3	<3
AD-30-450PM	φ30	450.0	6.1	5.5	446.5	<3
AD-30-500PM	φ30	500.0	6.0	5.5	496.5	<3
AD-40-60PM	φ40	60.2	19.3	11.0	50.2	<1
AD-40-70PM	φ40	70.3	17.2	10.2	61.7	<1
AD-40-80PM	φ40	80.2	15.8	9.7	71.8	<1
AD-40-100PM	φ40	99.9	13.7	8.9	92.8	<1
AD-40-120PM	φ40	120.0	12.3	8.3	113.7	<1
AD-40-150PM	φ40	150.1	10.9	7.7	144.5	<1
AD-40-170PM	φ40	169.7	10.3	7.5	164.5	<1
AD-40-200PM	φ40	199.7	9.6	7.2	194.8	<1
AD-40-220PM	φ40	220.7	9.2	7.0	216.0	<1
AD-40-250PM	φ40	249.1	8.8	6.9	244.6	<1
AD-40-300PM	φ40	300.5	8.3	6.7	296.1	<1
AD-40-350PM	φ40	349.9	7.9	6.5	345.8	<1
AD-40-400PM	φ40	399.7	7.6	6.4	395.7	<1
AD-40-450PM	φ40	450.0	7.4	6.3	445.5	<3
AD-40-500PM	φ40	500.0	7.2	6.3	495.6	<3

Compatible Optic Mounts

FLH--25.4S, -30AS, -40AS

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φ50 – φ100						
Part Number	Diameter D [mm]	Focal length f [mm]	Center Thickness tc [mm]	Edge Thickness te [mm]	Back focal length fb [mm]	Centration [']
AD-50-80PM	φ50	81.0	22.9	13.4	69.1	<1
AD-50-100PM	φ50	100.5	19.9	12.3	90.0	<1
AD-50-120PM	φ50	120.2	17.7	11.4	111.0	<1
AD-50-150PM	φ50	150.7	15.5	10.5	142.8	<1
AD-50-170PM	φ50	169.8	14.5	10.1	162.5	<1
AD-50-200PM	φ50	200.1	13.3	9.6	193.3	<1
AD-50-220PM	φ50	220.7	12.7	9.3	214.5	<1
AD50-250PM	φ50	249.4	12.1	9.1	243.4	<1
AD-50-300PM	φ50	299.5	11.2	8.7	293.7	<1
AD-50-350PM	φ50	350.2	10.7	8.6	344.5	<1
AD-50-400PM	φ50	400.0	10.2	8.3	394.7	<1
AD-50-450PM	φ50	451.5	9.9	8.3	446.2	<1
AD-50-500PM	φ50	500.3	9.6	8.1	495.2	<1
AD-50-600PM	φ50	599.9	9.2	8.0	594.4	<3
AD-50-700PM	φ50	700.0	8.9	7.8	694.6	<3
AD-50-800PM	φ50	800.0	8.6	7.7	794.9	<3
AD-50-1000PM	φ50	1000.0	8.3	7.6	995.0	<3
AD-50.8-100PM	φ50.8	100.5	19.9	12.1	90.0	<1
AD-50.8-120PM	φ50.8	120.2	17.7	11.2	111.0	<1
AD-50.8-150PM	φ50.8	150.7	15.5	10.4	142.8	<1
AD-50.8-200PM	φ50.8	200.1	13.3	9.5	193.3	<1
AD-50.8-250PM	φ50.8	249.4	12.1	9.0	243.4	<1
AD-50.8-300PM	φ50.8	299.5	11.2	8.6	293.7	<1
AD-50.8-400PM	φ50.8	400.0	10.2	8.3	394.7	<1
AD-50.8-500PM	φ50.8	500.3	9.6	8.1	495.2	<1
AD-50.8-700PM	φ50.8	700.0	8.9	7.8	694.6	<3
AD-50.8-1000PM	φ50.8	1000.0	8.3	7.5	995.1	<3
AD-60-170PM	φ60	170.8	17.7	11.4	161.9	<1
AD-60-200PM	φ60	200.3	16.1	10.7	192.1	<1
AD-60-250PM	φ60	250.0	14.3	10.0	242.8	<1
AD-60-500PM	φ60	499.1	10.7	8.6	493.5	<1
AD-60-600PM	φ60	597.9	10.1	8.3	592.6	<1
AD-80-150PM	φ80	149.7	30.3	17.2	133.6	<1
AD-80-200PM	φ80	200.8	24.3	14.7	188.2	<1
AD-80-300PM	φ80	299.8	18.8	12.4	290.2	<1
AD-80-500PM	φ80	502.6	14.5	10.7	494.9	<1
AD-80-800PM	φ80	800.6	12.1	9.7	794.2	<1
AD-100-200PM	φ100	200.6	37.0	21.8	181.0	<1
AD-100-300PM	φ100	297.3	28.0	18.0	283.2	<1
AD-100-500PM	φ100	499.6	21.1	15.2	488.8	<1
AD-100-800PM	φ100	799.5	17.4	13.7	790.4	<1
AD-100-1000PM	φ100	998.1	16.1	13.1	989.7	<1

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FLH--50S, -50.8S, -60S, -80, -100