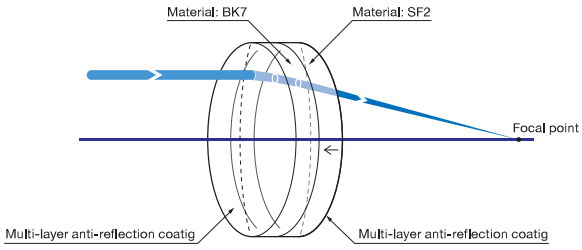
Achromatic Doublets | DLB

RoHS

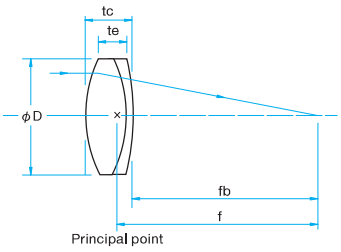
Achromatic doublets are cemented achromats made of two different lenses (Low dispersion positive from crown glass and high dispersion negative from flint glass). The difference of dispersion and shape of both lenses are designed to minimize the chromatic aberrations in blue (486.1nm), green (546.1nm)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

- The spherical aberration of achromatic doublets is better than singlets and minimized at infinite conjugate ratios.
- Achromatic Doublets are coated on both surfaces with a broadband multi-layer anti-reflection coating for the visible wavelength (400 – 700nm).
- 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 minimize spherical aberration.
- The difference in focal length of a lens at each wave length is Chromatic aberration and is due to “dispersion of the glass”, the change in refractive index of glass accordding to wavelength. 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)



●Tolerance

Diameter	≦ϕ60	$\phi D^{+0}_{-0.1}$
	ϕ80	$\phi D^{+0}_{-0.15}$
	ϕ100	$\phi D^{+0}_{-0.2}$
Thickness		tc ±0.2
Focal length		±1% (546.1nm)

Specifications

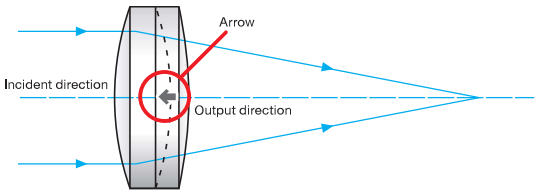
Material	BK7, SF2
Design wavelength	Blue: 486.1nm, Green: 546.1nm, Red: 656.3nm
Coating	Broadband multi-layer anti-reflection coating for the Visible
Cement	Ultraviolet Hardened Adhesive
Laser Damage Threshold	0.3J/cm^2 (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch–Dig)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

Guide

- Please contact our 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
- Air spaced focusing lenses are also available (NYTL/NYDL) designed for laser processing applications. Reference B181

Attention

- 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 minimize spherical aberration.
- The difference in focal length of a lens at each wave length is Chromatic aberration and is due to “dispersion of the glass”, the change in refractive index of glass accordding to wavelength. 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.



ϕ10 – ϕ25

Part Number	Diameter ϕD [mm]	Focal length f [mm]	Edge Thickness te [mm]	Center Thickness tc [mm]	Back focal length fb [mm]	Centration [′]
DLB-10-20PM	ϕ10	20.0	5.1	6.7	16.6	<1
DLB-10-25PM	ϕ10	25.0	4.9	6.1	22.1	<1
DLB-10-30PM	ϕ10	30.1	4.7	5.7	27.4	<1
DLB-10-40PM	ϕ10	40.0	4.6	5.3	37.5	<1
DLB-10-50PM	ϕ10	50.0	4.4	5.0	47.5	<1
DLB-10-60PM	ϕ10	60.1	4.4	4.9	57.6	<1
DLB-10-70PM	ϕ10	69.9	4.3	4.7	67.3	<1
DLB-10-80PM	ϕ10	80.1	4.2	4.6	77.8	<1
DLB-10-100PM	ϕ10	100.5	4.2	4.5	98.1	<1
DLB-12.7-25PM	ϕ12.7	25.1	5.3	7.3	21.5	<1
DLB-12.7-30PM	ϕ12.7	30.0	5.2	6.8	26.7	<1
DLB-12.7-40PM	ϕ12.7	40.1	4.9	6.1	36.9	<1
DLB-12.7-50PM	ϕ12.7	50.1	4.7	5.7	47.3	<1
DLB-12.7-60PM	ϕ12.7	60.0	4.6	5.4	57.3	<1
DLB-12.7-70PM	ϕ12.7	69.9	4.5	5.2	67.5	<1
DLB-12.7-80PM	ϕ12.7	79.9	4.5	5.1	77.4	<1
DLB-12.7-100PM	ϕ12.7	100.1	4.3	4.8	97.9	<1
DLB-15-25PM	ϕ15	25.2	6.0	8.8	20.7	<1
DLB-15-30PM	ϕ15	30.1	5.7	8.0	26.0	<1
DLB-15-40PM	ϕ15	40.1	5.2	6.9	36.5	<1
DLB-15-50PM	ϕ15	50.1	5.0	6.3	47.1	<1
DLB-15-60PM	ϕ15	59.9	4.8	5.9	57.0	<1
DLB-15-70PM	ϕ15	70.2	4.8	5.7	67.4	<1
DLB-15-80PM	ϕ15	79.9	4.7	5.5	77.1	<1
DLB-15-100PM	ϕ15	100.0	4.5	5.2	97.3	<1
DLB-20-30PM	ϕ20	30.6	6.8	10.9	24.9	<1
DLB-20-40PM	ϕ20	40.1	6.2	9.2	35.3	<1
DLB-20-50PM	ϕ20	50.2	5.7	8.1	46.0	<1
DLB-20-60PM	ϕ20	60.2	5.4	7.4	56.6	<1
DLB-20-70PM	ϕ20	70.1	5.2	6.9	66.7	<1
DLB-20-80PM	ϕ20	79.9	5.1	6.6	76.6	<1
DLB-20-100PM	ϕ20	99.5	4.9	6.1	96.4	<1
DLB-20-120PM	ϕ20	120.3	4.7	5.7	117.3	<1
DLB-20-150PM	ϕ20	149.8	4.6	5.4	147.0	<1
DLB-20-170PM	ϕ20	170.0	4.6	5.3	167.2	<1
DLB-20-200PM	ϕ20	200.1	4.5	5.1	197.3	<1
DLB-20-220PM	ϕ20	220.0	4.5	5.0	216.9	<3
DLB-20-250PM	ϕ20	250.0	4.4	4.9	247.0	<3
DLB-20-300PM	ϕ20	300.0	4.3	4.7	297.1	<3
DLB-25-40PM	ϕ25	40.9	7.7	12.5	34.2	<1
DLB-25-50PM	ϕ25	50.1	7.1	10.9	44.9	<1
DLB-25-60PM	ϕ25	60.1	6.7	9.8	55.2	<1
DLB-25-70PM	ϕ25	69.9	6.3	9.0	65.3	<1
DLB-25-80PM	ϕ25	80.0	6.2	8.5	75.9	<1
DLB-25-100PM	ϕ25	100.2	5.9	7.7	96.5	<1
DLB-25-120PM	ϕ25	119.8	5.6	7.2	116.2	<1
DLB-25-150PM	ϕ25	149.6	5.5	6.7	146.2	<1
DLB-25-170PM	ϕ25	170.4	5.3	6.4	167.1	<1
DLB-25-200PM	ϕ25	200.1	5.2	6.1	197.0	<1
DLB-25-220PM	ϕ25	222.0	5.2	6.0	218.9	<1
DLB-25-250PM	ϕ25	250.8	5.1	5.8	247.7	<1
DLB-25-300PM	ϕ25	300.0	5.0	5.6	296.6	<3

Compatible Optic Mounts

LHF-10S, -15S, -20S, -25S / LHA-25

Achromatic Doublets | DLB

Catalog Code W3076

ϕ25.4 – ϕ40

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

Compatible Optic Mounts

LHF-25.4S, -30AS, -40AS

ϕ50 – ϕ100

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

Compatible Optic Mounts

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

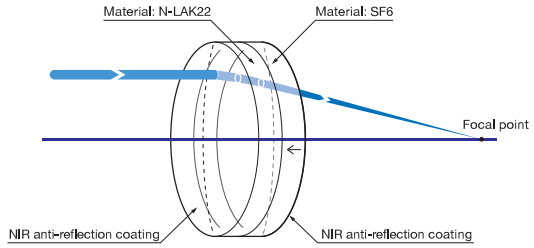
Near Infrared Achromatic Lens | DL-PNIR

RoHS Catalog Code W3195

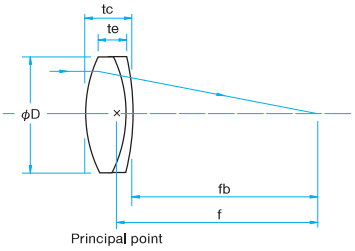
By bonding two lenses with wavelength dispersion of different refractive index the resulting component will provide reduced spherical aberration and chromatic aberration than that of a single spherical lens.
These achromatic lenses can be used as a focusing lens for YAG laser (1064nm) or LD of the near-infrared.

- The lens design is optimized so that the focal length change is minimized in the near infrared region. The focal length matches at 700nm, 880nm, 1100nm wavelengths and is optimized to minimize aberrations.
- It is suitable as a collimating lens not only because chromatic aberration but also spherical aberration is collected.

Schematic



Outline Drawing (in mm)



●Tolerance
Diameter $\phi D^{0}_{-0.1}$
Thickness tc±0.2
Focal length ±2%
(880nm)

Specifications

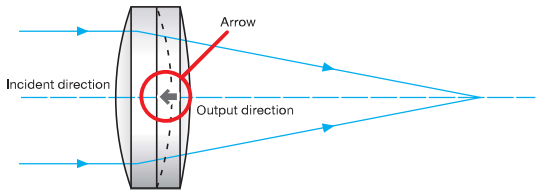
Material	N-LAK22, SF6
Design wavelength	700nm, 880nm, 1100nm
Coating	Multi-layer anti-reflection coating (700 – 1550nm)
Cement	Ultraviolet Hardened Adhesive
Laser Damage Threshold	0.3J/cm^2
Surface Quality (Scratch–Dig)	40–20
Clear aperture	90% of actual aperture

Guide

- For product other diameter size or focal lengths which are not listed on our website or in our catalog, please contact our Sales Division with your requests.
- The design and manufacture of achromatic lens of other wavelength bands are available upon requested.
- Focusing Lenses for Fiber Lasers (HFTLSQ/HFDLSQ) are also available. Reference B182

Attention

- Please use achromatic lens when focusing an image at infinity or when making parallel light from the one point of light source. It does not provide sufficient optical performance when used in such as short-range distance imaging.
- There is a direction to the incident light parallel to the achromatic lens. A surface with a small radius of curvature is allowed to be incident parallel light from a rear surface (the surface the arrow is pointing to). When it is incident parallel light from the opposite side, spherical aberration and chromatic aberration will occur and the focused spot size will increase.
- When used in the visible region, spherical aberration and chromatic aberration increases. In addition, the transmittance decreases.



Specifications

Part Number	Diameter ϕD [mm]	Focal length f [mm]	Edge Thickness te [mm]	Center Thickness tc [mm]	Back focal length fb [mm]	Centration [′]
DL-15-20PNIR	ϕ15	19.9	6.6	9.5	14.7	<3
DL-15-25PNIR	ϕ15	25.0	5.8	8.1	20.6	<3
DL-15-30PNIR	ϕ15	30.1	5.6	7.4	26.0	<3
DL-15-50PNIR	ϕ15	50.2	4.9	5.9	46.8	<3
DL-25-30PNIR	ϕ25	30.0	10.8	16.3	21.4	<3
DL-25-40PNIR	ϕ25	40.1	9.3	13.2	32.8	<3
DL-25-50PNIR	ϕ25	50.2	8.5	11.6	43.8	<3
DL-25-100PNIR	ϕ25	100.4	7.2	8.7	95.1	<3

Compatible Optic Mounts

LHF-15S, -25S

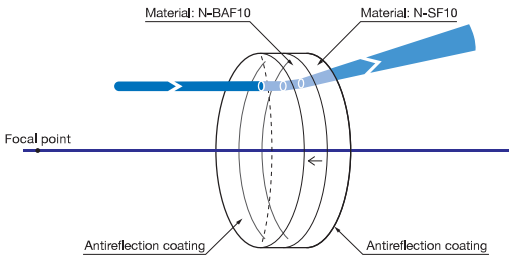
Negative Achromatic Lens | DL-NM

RoHS Catalog Code W3196

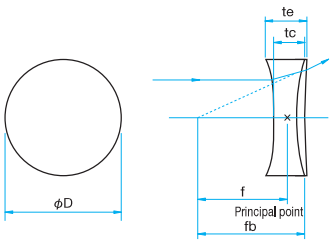
It is achromatic lens having a negative focal length.
By setting the concave one bonding two lenses wavelength dispersion of the refractive index is different, can be smaller than the spherical single lens and spherical aberration and chromatic aberration.

- It is optimized focal length shift is small in the visible light range, the aberration is minimized.
- It can be the beam expander of Galileo type in combination with achromatic lens with a focal length of the positive.

Schematic



Outline Drawing (in mm)



●Tolerance
Diameter $\phi D^{0}_{-0.1}$
Thickness tc±0.2
Focal length ±2%
(546.1nm)

Specifications

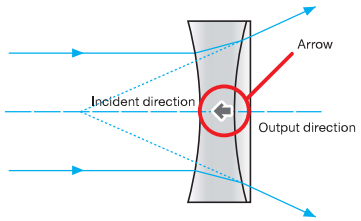
Material	N-BAF10, N-SF10
Design wavelength	486.1nm, 546.1nm, 656.3nm
Coating	Antireflection coating
Cement	Ultraviolet Hardened Adhesive
Laser Damage Threshold	0.3J/cm^2
Surface Quality (Scratch–Dig)	40–20
Clear aperture	90% of actual aperture

Guide

▶For custom focal lengths and diameter sizes not listed on-line or in our catalog please contact our Sales Division.

Attention

▶There is a direction to the incident parallel light to the achromatic lens. A surface with a small radius of curvature is allowed to be incident parallel light from a rear surface (the surface on the arrow is pointing to). When it is incident parallel light from the opposite side, spherical aberration and chromatic aberration will occur.
▶When used in the visible region, spherical aberration and chromatic aberration increases. In addition, the transmittance decreases.



Specifications

Part Number	Diameter ϕD [mm]	Focal length f [mm]	Edge Thickness te [mm]	Center Thickness tc [mm]	Back focal length fb [mm]	Centration [′]
DL-25-50NM	ϕ25	–49.94	9.3	6.7	–53.1	<3
DL-25-100NM	ϕ25	–99.94	5.9	4.6	–102.3	<3

Compatible Optic Mounts

LHF-25S

Reasonable Achromatic Lens | S-DLB

RoHS Catalog Code W3197

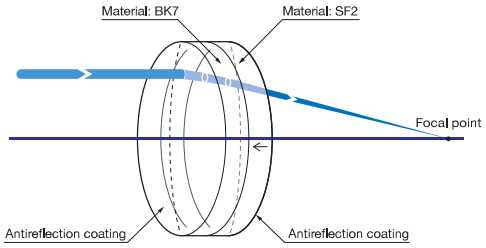
An economic general use achromatic lens suitable for an optical system, which does not require high surface quality imaging such as a microscope lens or telescope lens.

- Specification except surface quality is almost the same as DLB series. Except when used in high-precision experiment using a laser, this lens is recommended.
- It is optimized so that focal length gap is small in the visible light range and the aberration is minimized.

Specifications

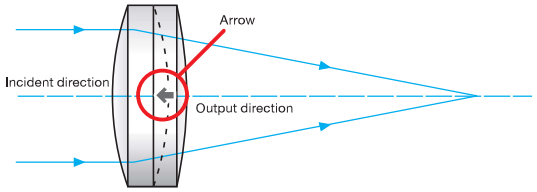
Material	BK7, SF2
Design wavelength	Blue: 486.1nm, Green: 546.1nm, Red: 656.3nm
Centration	<3′
Cement	Ultraviolet Hardened Adhesive
Coating	Antireflection coating
Surface Quality (Scratch–Dig)	60–40
Clear aperture	90% of actual aperture
Laser Damage Threshold	0.3J/cm^2 (Laser pulse width 10ns, repetition frequency 20Hz)

Schematic

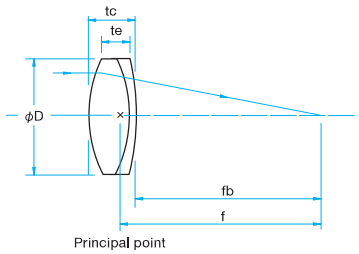


Attention

- Achromatic lens is used when focusing an image at infinity or when making the point light source to collimated light. It does not provide sufficient optical performance when used in such as short-range imaging.
- There is a direction of the incident parallel light with achromatic lens. The radius of curvature is allowed to be incident parallel light from the side of (the surface indicated by arrows) small curvature surface. If the parallel light incidents from the opposite side, then spherical aberration and chromatic aberration occur and the focused spot size will be large.



Outline Drawing (in mm)



●Tolerance
Diameter<ϕ30 $\phi D^{+0}_{-0.1}$
Thickness tc±0.2
Focal length ±1% (546.1nm)

ϕ10 – ϕ20

Part Number	Diameter ϕD [mm]	Focal length f [mm]	Edge Thickness te [mm]	Center Thickness tc [mm]	Back focal length fb [mm]
S-DLB-10-20PM	ϕ10	20.0	5.1	6.7	16.6
S-DLB-10-25PM	ϕ10	25.0	4.9	6.1	22.1
S-DLB-10-40PM	ϕ10	40.0	4.6	5.3	37.5
S-DLB-10-50PM	ϕ10	50.0	4.4	5.0	47.5
S-DLB-10-100PM	ϕ10	100.5	4.2	4.5	98.1
S-DLB-15-25PM	ϕ15	25.2	6.0	8.8	20.7
S-DLB-15-30PM	ϕ15	30.1	5.7	8.0	26.0
S-DLB-15-40PM	ϕ15	40.1	5.2	6.9	36.5
S-DLB-15-50PM	ϕ15	50.1	5.0	6.3	47.1
S-DLB-15-80PM	ϕ15	79.9	4.7	5.5	77.1
S-DLB-15-100PM	ϕ15	100.0	4.5	5.2	97.3
S-DLB-20-30PM	ϕ20	30.6	6.8	10.9	24.9
S-DLB-20-40PM	ϕ20	40.1	6.2	9.2	35.3
S-DLB-20-50PM	ϕ20	50.2	5.7	8.1	46.0
S-DLB-20-60PM	ϕ20	60.2	5.4	7.4	56.6
S-DLB-20-70PM	ϕ20	70.1	5.2	6.9	66.7
S-DLB-20-80PM	ϕ20	79.9	5.1	6.6	76.6
S-DLB-20-100PM	ϕ20	99.5	4.9	6.1	96.4
S-DLB-20-120PM	ϕ20	120.3	4.7	5.7	117.3
S-DLB-20-150PM	ϕ20	149.8	4.6	5.4	147.0
S-DLB-20-200PM	ϕ20	200.1	4.5	5.1	197.3

ϕ25 – ϕ30

Part Number	Diameter ϕD [mm]	Focal length f [mm]	Edge Thickness te [mm]	Center Thickness tc [mm]	Back focal length fb [mm]
S-DLB-25-50PM	ϕ25	50.1	7.1	10.9	44.9
S-DLB-25-70PM	ϕ25	69.9	6.3	9.0	65.3
S-DLB-25-100PM	ϕ25	100.2	5.9	7.7	96.5
S-DLB-25-120PM	ϕ25	119.8	5.6	7.2	116.2
S-DLB-25-150PM	ϕ25	149.6	5.5	6.7	146.2
S-DLB-30-60PM	ϕ30	60.3	8.1	12.6	53.9
S-DLB-30-100PM	ϕ30	100.7	6.8	9.5	96.0
S-DLB-30-120PM	ϕ30	120.1	6.6	8.8	115.7
S-DLB-30-150PM	ϕ30	150.0	6.3	8.1	146.0
S-DLB-30-200PM	ϕ30	200.2	6.0	7.3	196.4
S-DLB-30-300PM	ϕ30	300.4	5.7	6.6	296.9

Compatible Optic Mounts

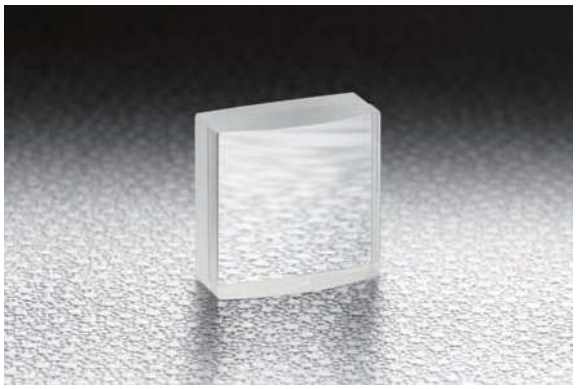
LHF-10S, -15S, -20S, -25S, -30S

Achromatic Cylindrical Lens | CDL

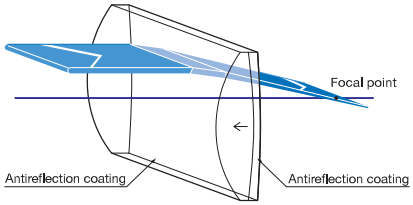
RoHS Catalog Code W3198

A cylindrical achromat is single component made by bonding two cylindrical surface lenses having different refractive indexes. The resulting achromat creates fine lines close to the theoretical limit. The cylindrical achromat is recommended if blurred lines and color bleeding is a concern when using cylindrical plano-convex lens (CLB-P).

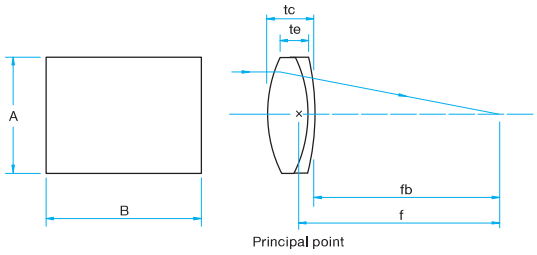
- It is designed so that difference of focusing point is reduced as much as possible in the visible light range.
- Optical adjustment is easy to do as direction of the condenser line will be parallel to the side of the diameter (B).
- It can be used as a substitute for a slit spectrograph.



Schematic



Outline Drawing (in mm)



●Tolerance

Length	$A^{+0}_{-0.2}$ $B^{+0}_{-0.2}$
Thickness	tc±0.2
Focal length	±3% (546.1nm)

Specifications

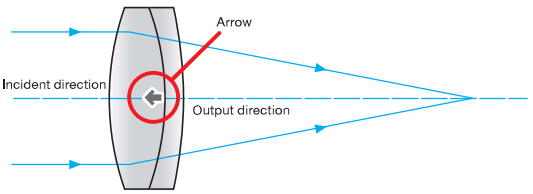
Material	N-SF5, BK7
Design wavelength	Blue: 486.1nm, Green: 546.1nm, Red: 656.3nm
Coating	Antireflection coating
Cement	Ultraviolet cure adhesive
Laser Damage Threshold	0.3J/cm^2 (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch–Dig)	60–40
Clear aperture	Circle that internally connected to 90% of the side length

Guide

- Different focal length and diameters not mentioned on-line or in our catalog are available as a custom product upon on request.
- Cylindrical lens holder (CHA) is available for mounting the achromatic cylinder lens. WEB Reference Catalog Code W4022

Attention

- There is a direction of the incident parallel light with achromatic cylinder lens. The radius of curvature is allowed to be incident parallel light from the side of (the surface indicated by arrows) small curvature surface. If it is incident parallel light from the opposite side, condensing line will be thick.
- In the generatrix direction (B direction), there is no characteristic to reduce the effect of achromatic, reducing aberration, and for collecting light.
- If it is incident line beam source into achromatic cylindrical lens, parallel light does not come out. It will diverge in the direction of the generatrix (B direction).
- In order to focus the fine beam line, it is necessary to enter the lens a parallel beam of high quality.



Specifications

Part Number	A×B [mm]	Focal length f [mm]	Edge Thickness te [mm]	Center Thickness tc [mm]	Back focal length fb [mm]
CDL-1515-25PM	15×15	25.0	6.4	9.0	18.2
CDL-1515-50PM	15×15	50.0	4.7	6.0	46.4
CDL-1515-100PM	15×15	100.0	4.3	5.0	97.1

Compatible Optic Mounts

CHA-25

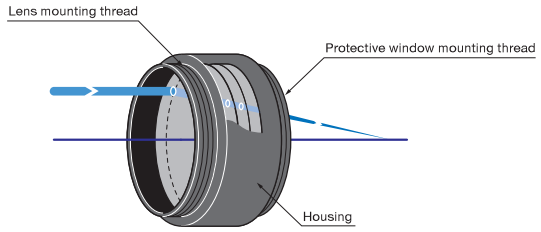
Visible Spectrum Achromats | ATL/NADL

RoHS Catalog Code W3078

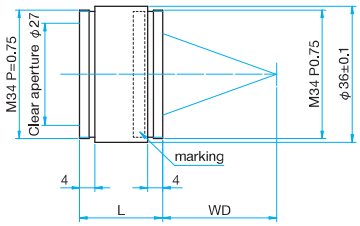
Visible spectrum achromats are air spaced achromatic triplets or doublets for lasers in the visible spectrum or white light applications.
The elements are made of crown glass of low dispersion and flint glass of high dispersion.

- These lenses have been optimized for achromatic and spherical aberrations and coma for the 3 wavelengths; blue (486.1nm), green (546.1nm) and red (656.3nm). They are coated with a broadband multi-layer anti-reflection coating for 400 – 700nm.
- Air spaced design allows high power laser applications which includes YAG second harmonic wavelength (532nm).
- The triplets with F-numbers ≧2 and doublets with F-numbers ≧3 are designed to have each spot size equal to the diffraction limited spot size and very ideal for a Gaussian input beam.

Schematic



Outline Drawing (in mm)



●Tolerance
Length L±0.2
Focal length ±2%

Specifications

Material	Crown Glass – (Air spaced) – Flint Glass
Material of frame	Aluminum Finishing: Black anodized
Design wavelength	486nm, 532nm, 656nm
Coating	Broadband multil-ayer anti-reflection coating
Acceptance angle	±1°
Laser Damage Threshold	1J/cm^2 (Laser pulse width 10ns, repetition frequency 20Hz)

Guide

- Please contact our Sales Division for customized achromats. (Customized on size etc.)
- Protective lens case with rods for mirror holders is available as an option. Please contact us for further information.
- Please check the “wavelength characteristic of the focal length data” on the Web for the focal lengths of each wavelength.
  WEB Reference Catalog Code W3078

Attention

- Since the focal length and working distance of the lens is calculated at 532nm, it will change at other wavelengths due to the refractive index of the material shift.
- The F number of a lens is calculated by f (effective focal length) / De (effective clear aperture). The value represents “Brightness of the lens”. The lower the value, the brighter the lens is.
- Be sure to wear laser safety goggles when checking optical path and adjusting optical axis.

Specifications

Part Number	Focal length f [mm]	Length L [mm]	Numerical aperture (NA)	Working distance (WD) [mm]
ATL-30-40PY2	40.2	22	0.34	30.1
ATL-30-50PY2	49.4	22	0.27	39.0
ATL-30-60PY2	58.9	22	0.23	49.0
NADL-30-80PY2	80.1	13	0.17	71.8
NADL-30-100PY2	99.8	13	0.14	91.9
NADL-30-150PY2	150.0	12	0.09	142.1
NADL-30-200PY2	199.8	12	0.07	193.1

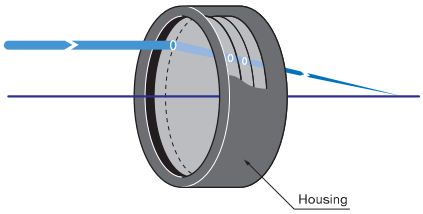
Compatible Optic Mounts

LHF-M34-30

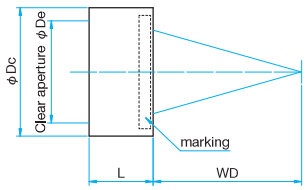
These lenses contain elements which have different refractive indexes and produce a high degree of correction across a bandwidth of 200 - 400nm.
They can be used as a laser focusing lens for broadband ultra-violet sources.

- NA 0.1 or below (ETL model NA 0.25) can be focused to the diffraction limit.
- No adhesive or heat absorption materials are used to produce these lenses and they show high resistance to ultra-violet light.
- These are not achromatic corrective but offers correction on spherical and comatic aberration.

Schematic



Outline Drawing (in mm)



●Tolerance
Diameter ϕDc ±0.1
Length L ±0.2
Focal length ±2%

Specifications

Material	Synthetic fused silica for Excimer Laser – Calcium fluoride (CaF_2)
Material of frame	Aluminum Finishing: Black anodized
Design wavelength	200nm, 308nm, 400nm
Coating	Uncoated
Acceptance angle	±1°

Guide

- Products that are not listed in the table or in the catalog such as high pulse lasers or different wavelengths are available upon request, please contact our Sales Division.
- We can provide catalog and custom lenses in large volume to your specifications.
- For details on focal length of each wavelength, please see details on our web site. WEB Reference Catalog Code W3083

Attention

- These focusing lenses are made for use to image an object located in an infinitive distance or using a point of source as a parallel light.
- The correct direction to input a parallel light is the side with barrel lettering. If the direction is wrong, the spherical aberration will be increased and the image unfocused.
- If Focusing lens is used with the designed wavelength the spherical aberration and transmission will be poor.
- Usage with high power laser or near a high temperature light source, the high heat build-up in the lens may alter the focal length. To avoid this, heat prevention is required.
- To reduce the focus spot size, ensure that the input beam diameter ($1/e^2$) is reduced to half of the effective diameter of the focus lens.
- These focusing lenses are not chromatic lenses; they are not optically corrected.
- The lenses have 3 to 4% of reflectivity per surface; therefore about 13% of loss is expected in transmission.

Specifications

Part Number	Focal length f [mm]	Diameter ϕDc [mm]	Clear aperture ϕDe [mm]	Length L [mm]	Numerical aperture (NA)	Working distance (WD) [mm]
UDL-30-50P	50.4	ϕ34	ϕ27	17	0.27	39.3
UDL-30-80P	80.0	ϕ34	ϕ27	14	0.17	72.4
UDL-30-100P	100.1	ϕ34	ϕ27	13	0.14	92.5
NUDL-30-150P	151.5	ϕ34	ϕ27	16	0.09	137.1
NUDL-30-200P	200.3	ϕ34	ϕ27	16	0.07	185.2
UDL-40-80P	80.3	ϕ44	ϕ37	17	0.23	70.1
NUDL-40-100P	100.0	ϕ44	ϕ37	18	0.19	87.7
NUDL-40-150P	149.0	ϕ44	ϕ37	18	0.12	134.4
NUDL-40-200P	201.2	ϕ44	ϕ37	18	0.09	185.5
NUDL-40-250P	249.7	ϕ44	ϕ37	19	0.07	230.7
UDL-50-100P	100.8	ϕ54	ϕ47	20	0.24	89.1
NUDL-50-150P	149.7	ϕ54	ϕ47	21	0.16	136.3
NUDL-50-200P	200.0	ϕ54	ϕ47	22	0.12	179.9
NUDL-50-250P	252.4	ϕ54	ϕ47	21	0.09	233.0
NUDL-50-300P	300.9	ϕ54	ϕ47	22	0.08	278.8

Compatible Optic Mounts

LHF-UDL-30 / -40 / -50