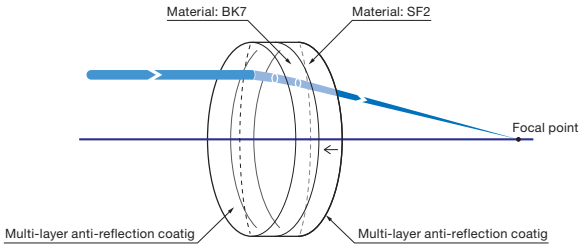
Achromatic Doublets | DLB

RoHS

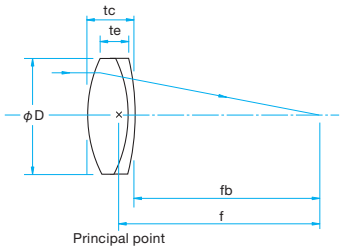
Achromatic doublets are cemented achromats made of two different lenses (Low dispersion positive from crown glass and high dispersion negative from flint glass). The difference of dispersion and shape of both lenses are designed to minimize the chromatic aberrations in blue (486.1nm), green (546.1nm)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

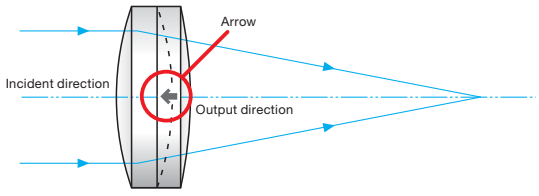
Material	BK7, SF2
Design wavelength	Blue: 486.1nm, Green: 546.1nm, Red: 656.3nm
Coating	Broadband multi-layer anti-reflection coating for the Visible
Cement	Ultraviolet Hardened Adhesive
Laser Damage Threshold	0.3J/cm^2 (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch–Dig)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