

LENSES

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DDC TECHNOLOGIES

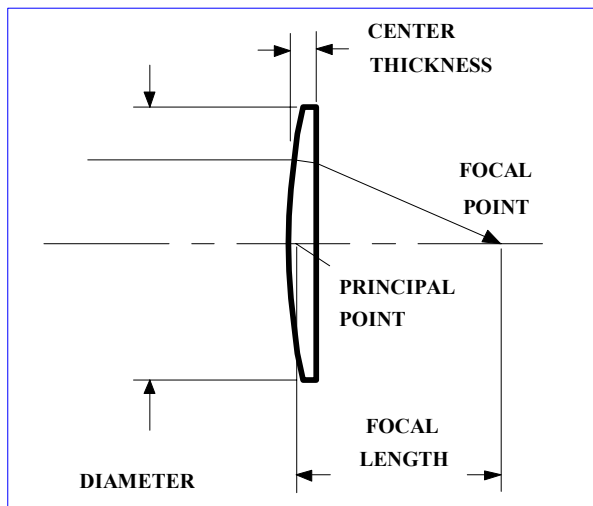


Fig. 27 Plano-convex Lens.

Plano convex lenses as a rule are used as collimating condensers and for focusing of collimated beams. Note, that collimated beam should contact with curved part of the length as it shown on Fig 28. Lenses from such materials (borosilicate crown glass) have a low cost and have preference with respect to fused silica if operating at high temperature or UV transmittance is not required. These lenses have low spherical aberrations too.

SPECIFICATION

Material	BK7
Surface quality	40-20 scratch-dig
Optical aperture	90% of the diameter
Diameter tolerance	+0.00, -0.12mm
Thickness tolerance	± 0.2mm
Focal length	± 1%

Model	Dia. (mm)	Focal length (mm)	Center Thickness (mm)	Price
22005	6.35	6.4	5.38	\$16.90
22007	6.35	12.7	3.81	\$15.60
22009	6.35	25.4	3.39	\$15.60
22011	6.35	50.2	3.19	\$15.60
22013	6.35	75.6	3.12	\$15.60
22015	6.35	100.0	3.09	\$15.60
22103	12.70	25.4	4.63	\$16.90
22105	12.70	50.2	3.78	\$15.60
22107	12.70	75.6	3.51	\$15.60
22109	12.70	100.0	3.39	\$15.60
22111	12.70	150.0	3.26	\$15.60
22113	12.70	250.0	3.15	\$15.60
22203	25.40	25.4	12.8	\$19.50
22205	25.40	50.2	6.32	\$18.85
22207	25.40	75.6	5.12	\$18.20
22209	25.40	100.0	4.58	\$18.20
22211	25.40	150.0	4.04	\$18.20
22213	25.40	200.0	3.78	\$18.20
22215	25.40	250.0	3.62	\$16.90
22217	25.40	300.0	3.52	\$16.90
22219	25.40	500.0	3.31	\$16.90
22221	25.40	1000.0	3.15	\$16.90
22303	50.80	75.6	12.38	\$27.30
22305	50.80	100.0	9.67	\$26.00
22307	50.80	150.0	7.27	\$26.00
22309	50.80	250.0	5.52	\$26.00
22311	50.80	500.0	4.25	\$25.35
22313	50.80	1000.0	3.62	\$24.70
22403	76.20	100.0	19.76	\$37.70
22405	76.20	200.0	10.27	\$36.40
22407	76.20	300.0	7.75	\$35.10
22409	76.20	1000.0	4.40	\$35.10

Contact DDC TECHNOLOGIES for other size or focal length



Plano concave lenses as a rule are used for decreasing of overall focal length and for increasing of beam size in lens combination. Focal point for these lenses is the point of imaginary intersection of diverging light rays (Fig. 29). Focal length in this case is believed negative and is twice the radius of curvature of length. Note, that for lowest spherical aberration curved surface must contact the parallel beam. These lenses also have preference with respect to fused silica lenses if operating at high temperature or UV transmittance is not required.

SPECIFICATIONS

Material	BK7
Surface quality	40-20 scratch-dig
Optical aperture	90% of the diameter
Diameter tolerance	+0.00, -0.12mm
Thickness tolerance	± 0.2mm
Focal length	± 1%

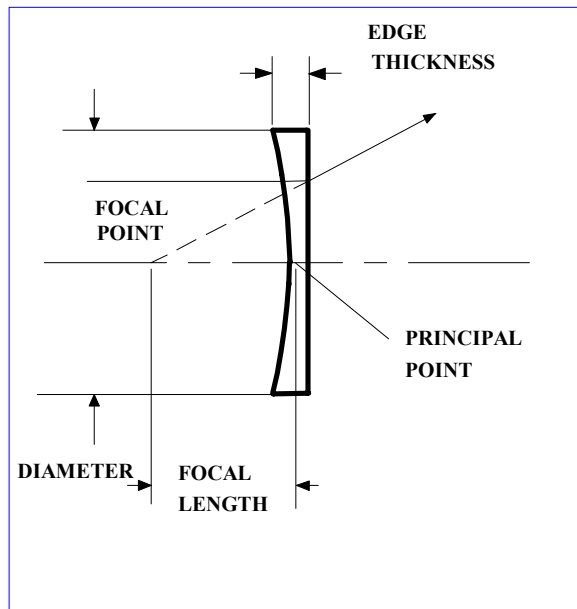


Fig. 29 Plano-concave Lens.

Model	Dia. (mm)	Focal length (mm)	Edge Thickness (mm)	Price
23003	6.35	-12.7	3.16	\$15.60
23007	6.35	-25.4	2.82	\$11.70
23103	12.70	-25.4	3.83	\$11.70
23105	12.70	-50.2	3.14	\$11.70
23107	12.70	-75.6	2.92	\$11.70
23109	12.70	-100.0	2.81	\$11.70
23203	25.40	-25.4	9.39	\$19.50
23205	25.40	-50.2	5.16	\$14.30
23207	25.40	-75.6	4.22	\$14.30
23209	25.40	-100.0	3.78	\$14.30
23211	25.40	-150.0	3.34	\$13.65
23213	25.40	-200.0	3.13	\$13.00
23303	50.80	-75.6	9.95	\$29.90
23305	50.80	-100.0	7.83	\$27.30
23307	50.80	-150.0	5.94	\$27.30
23309	50.80	-250.0	4.53	\$26.00
23311	50.80	-500.0	3.51	\$24.70
23405	76.20	-200.0	9.00	\$61.10
23407	76.20	-1000.0	3.85	\$61.10

Contact DDC TECHNOLOGIES for other size or focal length.

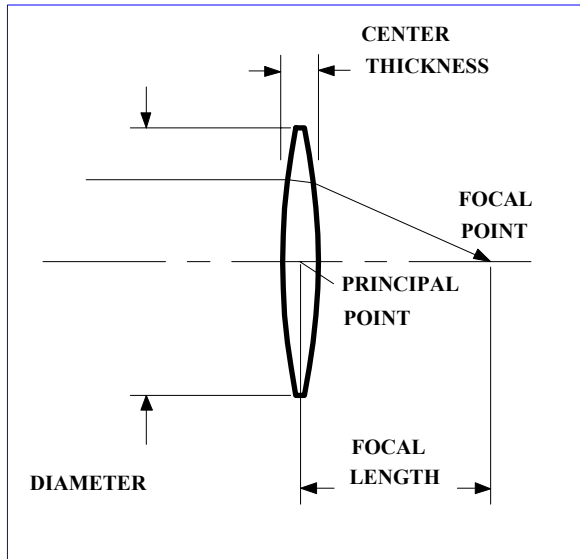


Fig. 31 Bi-convex Lens.

Optical glass bi-convex lenses are used for obtaining images at magnifications close to 1 and for beam focusing when the short focal length of the system is more critical than the image quality or spot size. The radii of curvature of both sides of such lenses are equal. It leads to low optical aberrations such as coma, distortion and chromatic aberrations when magnifications are in the range 0.2 - 5. Note, that the focal length of such lenses is equal to radius of curvature (see Fig 31). Lenses from such material (borosilicate crown glass) have a low cost and have preference with respect to fused silica when the thermal breakage or distortion hazard is low and you want to cut the UV part of the broadband source emission.

Model	Dia. (mm)	Focal length (mm)	Center Thickness (mm)	Price
22505	6.35	6.4	4.96	\$18.20
22507	6.35	12.7	3.82	\$16.90
22509	6.35	25.4	3.39	\$16.90
22511	6.35	50.2	3.19	\$16.90
22513	6.35	75.6	3.12	\$16.90
22601	12.70	12.7	6.68	\$18.20
22603	12.70	25.4	4.61	\$16.90
22605	12.70	50.2	3.78	\$16.90
22607	12.70	75.6	3.51	\$16.90
22609	12.70	100.0	3.39	\$16.25
22611	12.70	150.0	3.26	\$16.25
22703	25.40	25.4	10.13	\$19.50
22705	25.40	50.2	6.22	\$18.85
22707	25.40	75.6	5.10	\$18.20
22709	25.40	100.0	4.57	\$18.20
22711	25.40	150.0	4.04	\$16.90
22713	25.40	200.0	3.78	\$16.90
22715	25.40	250.0	3.62	\$16.90
22717	25.40	500.0	3.31	\$16.25
22719	25.40	1000.0	3.15	\$16.25
22803	50.80	50.8	17.27	\$27.30
22805	50.80	100.0	9.44	\$27.30
22807	50.80	150.0	7.22	\$26.00
22809	50.80	250.0	5.51	\$26.00
22811	50.80	500.0	4.25	\$26.00
22813	50.80	1000.0	3.62	\$26.00
22903	76.20	100.0	18.05	\$58.50
22905	76.20	200.0	10.00	\$58.50
22907	76.20	1000.0	4.40	\$58.50

Contact DDC TECHNOLOGIES for other size or focal length.

SPECIFICATIONS

Material	BK7
Surface quality	40-20 scratch-dig
Optical aperture	90% of the diameter
Diameter tolerance	+0.00, -0.12mm
Thickness tolerance	± 0.2mm
Focal length	± 1%

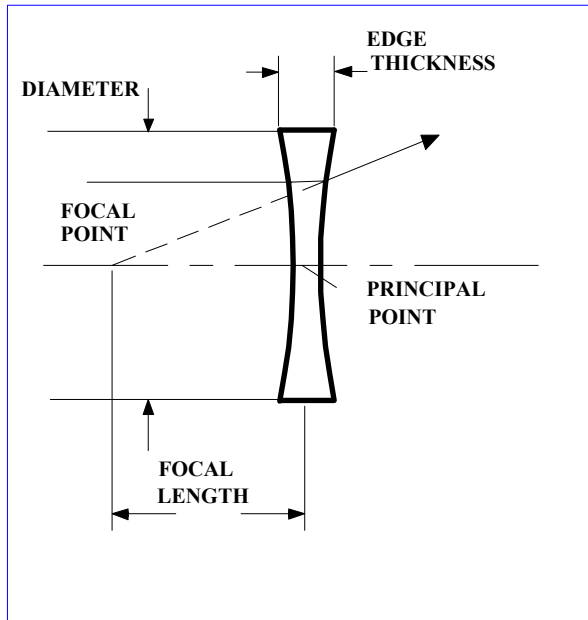


Fig. 32 Bi-concave Lens.

The application of bi-concave lenses is quiet analogous to plano concave lenses (see previous pages) but since every concave surface deliver its contribution to the lens power these kind of lenses can be made with the shorter focal lengthes.

The focal length is equal to the radius of curvature which is the same for the both sides of lens. In such case the focal length is believed the negative (see Fig. 32). In order to know the conditions for which the bi-concave lenses from borosilicate crown glass is better then fused silica ones see previous pages.

SPECIFICATIONS

Material	BK7
Surface quality	40-20 scratch-dig
Optical aperture	90% of the diameter
Diameter tolerance	+0.00, -0.12mm
Thickness tolerance	± 0.2mm
Focal length	± 1%

Model	Dia. (mm)	Focal Length (mm)	Edge Thickness (mm)	Price
23503	6.35	-6.25	3.74	\$15.60
23507	6.35	-12.7	3.12	\$15.60
23603	12.70	-12.7	5.07	\$16.25
23605	12.70	-25.4	3.75	\$11.70
23607	12.70	-50.2	3.12	\$11.70
23609	12.70	-75.6	2.92	\$11.70
23611	12.70	-100.0	2.81	\$11.70
23703	25.40	-25.4	7.73	\$19.50
23705	25.40	-50.2	5.03	\$14.30
23707	25.40	-75.6	4.18	\$14.30
23709	25.40	-100.0	3.76	\$14.30
23711	25.40	-150.0	3.34	\$14.30
23713	25.40	-200.0	3.13	\$13.65
23803	50.80	-75.6	9.35	\$32.50
23805	50.80	-100.0	7.59	\$29.90
23807	50.80	-150.0	5.88	\$29.90
23809	50.80	-250.0	4.53	\$29.90
23811	50.80	-500.0	3.51	\$29.90
23905	76.20	-200.0	9.00	\$63.70
23907	76.20	-1000.0	3.85	\$63.70

Contact DDC TECHNOLOGIES for other size or focal length.

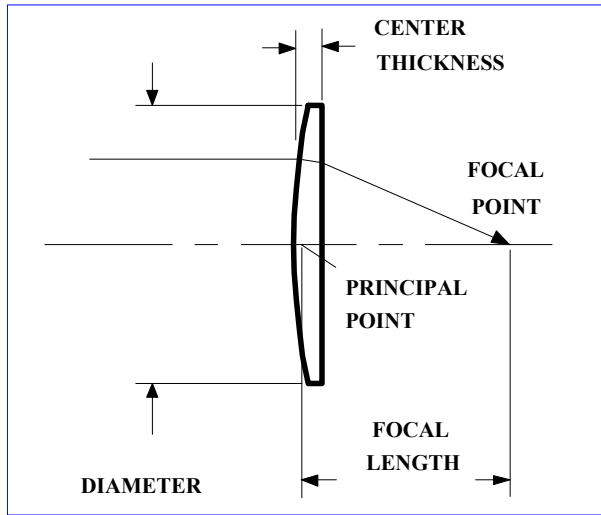


Fig. 33 Plano-convex Lens.

These plano convex lenses are made from the high quality fused silica. As the borosilicate crown glass lenses these lenses focus collimated light or collimate diverging light from a small sources with low spherical aberrations.

The material of lenses has good transmittance between 190 and 2500 nm. These lenses are useful for the applications which require the UV transmittance. Low coefficient of expansion and high thermal conductivity of these lenses helps to prevent breakage and thermal distortion.

SPECIFICATIONS

Material	UV grade fused silica
Surface quality	40-20 scratch-dig
Optical aperture	90% of the diameter
Diameter tolerance	+0.00, -0.12mm
Thickness tolerance	± 0.2mm
Focal length	± 1%

Model	Dia. (mm)	Focal Length (mm)	Center Thickness (mm)	Price
25007	6.35	12.7	3.94	\$37.70
25009	6.35	25.4	3.44	\$37.70
25011	6.35	50.2	3.22	\$37.70
25013	6.35	75.6	3.14	\$37.70
25015	6.35	100.0	3.11	\$37.70
25103	12.70	25.4	4.88	\$58.50
25105	12.70	50.2	3.89	\$50.70
25107	12.70	75.6	3.59	\$50.70
25109	12.70	100.0	3.44	\$45.50
25111	12.70	150.0	3.29	\$45.50
25113	12.70	250.0	3.18	\$48.10
25205	25.40	50.2	6.82	\$75.40
25207	25.40	75.6	5.41	\$75.40
25209	25.40	100.0	4.79	\$66.30
25211	25.40	150.0	4.18	\$66.30
25213	25.40	200.0	3.88	\$65.00
25215	25.40	250.0	3.71	\$65.00
25217	25.40	300.0	3.59	\$63.70
25219	25.40	500.0	3.35	\$62.40
25221	25.40	1000.0	3.18	\$62.40
25303	50.80	75.6	14.09	\$205.40
25305	50.80	100.0	10.68	\$202.80
25307	50.80	150.0	7.86	\$188.50
25309	50.80	250.0	5.85	\$175.50
25311	50.80	500.0	4.41	\$141.70
25313	50.80	1000.0	3.70	\$128.70
25403	76.20	100.0	23.35	\$370.50
25405	76.20	200.0	11.29	\$305.50
25407	76.20	300.0	8.38	\$279.50
25409	76.20	1000.0	4.59	\$258.70

Contact DDC TECHNOLOGIES for other size or focal length.



These plano concave lenses are made from the high quality fused silica. As for borosilicate crown glass lenses focal point for these lenses is the point of imaginary intersection of diverging light rays. Focal length in this case is believed negative and is twice the radius of curvature. Note, that for lowest spherical aberration curved surface must contact the parallel beam.

The material of lenses has good transmittance between 190 and 2500 nm. These lenses are useful for the applications which require the UV transmittance. Low coefficient of expansion and high thermal conductivity of these lenses helps to prevent breakage and thermal distortion.

SPECIFICATIONS

Material	UV grade fused silica
Surface quality	40-20 scratch-dig
Optical aperture	90% of the diameter
Diameter tolerance	+0.00, -0.12mm
Thickness tolerance	± 0.2mm
Focal length (F)	± 1%

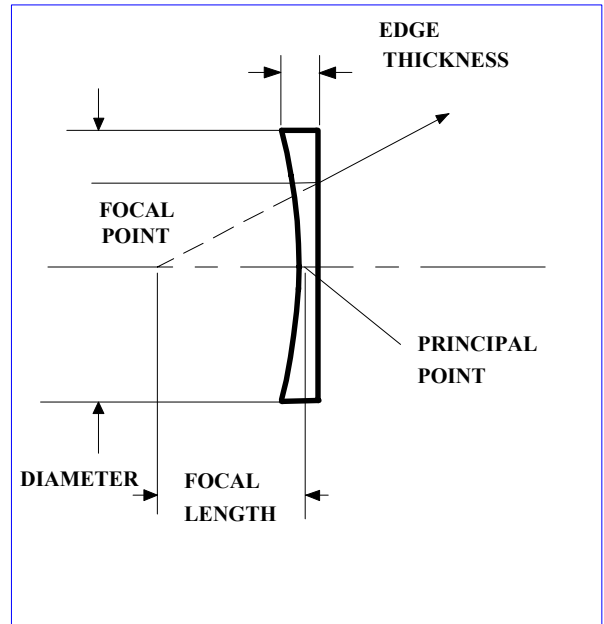


Fig. 35 Plano-concave Lens.

Model	Dia. (mm)	Focal Length (mm)	Edge Thickness (mm)	Price
26005	6.35	-12.7	3.26	\$55.90
26105	12.70	-25.4	4.02	\$55.90
26205	25.40	-50.2	5.54	\$67.60
26207	25.40	-75.6	4.45	\$65.00
26209	25.40	-100.0	3.94	\$65.00
26211	25.40	-150.0	3.45	\$63.70
26213	25.40	-200.0	3.21	\$63.70
26215	25.40	-250.0	3.07	\$63.70
26217	25.40	-1000.0	2.64	\$63.70
26305	50.80	-100.0	8.59	\$201.50
26307	50.80	-150.0	6.40	\$179.40
26309	50.80	-250.0	4.80	\$183.30
26311	50.80	-500.0	3.64	\$183.30
26313	50.80	-1000.0	3.07	\$188.50

Contact DDC TECHNOLOGIES for other size or focal length.

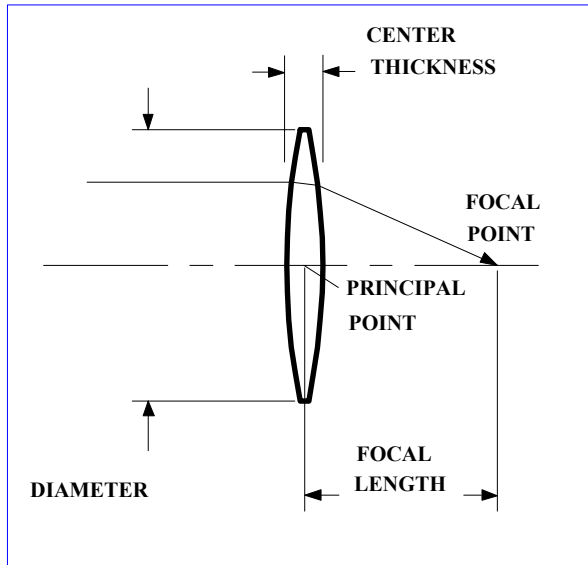


Fig. 36 Bi-convex Lens.

As the optical glass bi-convex lenses the fused silica ones are used for obtaining images at magnifications close to 1 and for beam focusing when the short focal length of the system is more critical than the image quality or spot size. The radii of curvature of both sides of such lenses are equal. It leads to low optical aberrations such as coma, distortion and chromatic aberrations when magnifications are in the range 0.2 - 5. Note, that the focal length of such lenses is equal to radius of curvature (see Fig 36). Lenses from such material (high optical quality fused silica) are useful for the applications which require the UV transmittance. Low coefficient of expansion and high thermal conductivity of these lenses helps to prevent breakage and thermal distortion.

SPECIFICATIONS

Material	UV grade fused silica
Surface quality	40-20 scratch-dig
Optical aperture	90% of the diameter
Diameter tolerance	+0.00, -0.12mm
Thickness tolerance	± 0.2mm
Focal length	± 1%

Model	Dia. (mm)	Focal Length (mm)	Center Thickness (mm)	Price
25505	6.35	6.4	5.41	\$57.20
25507	6.35	12.7	3.93	\$57.20
25509	6.35	25.4	3.44	\$55.90
25511	6.35	50.2	3.22	\$55.90
25601	12.70	12.70	6.76	\$58.50
25603	12.70	25.4	4.82	\$50.70
25605	12.70	50.2	3.83	\$44.20
25607	12.70	100.0	3.44	\$41.60
25609	12.70	250.0	3.18	\$50.70
25703	25.40	25.4	11.36	\$88.40
25705	25.40	50.2	6.65	\$67.60
25707	25.40	75.6	5.37	\$67.60
25709	25.40	100.0	4.78	\$63.70
25711	25.40	200.0	3.88	\$58.50
25713	25.40	500.0	3.35	\$54.60
25715	25.40	1000.0	3.17	\$54.60
25803	50.80	50.2	19.73	\$227.50
25805	50.80	100.0	10.30	\$197.60
25807	50.80	250.0	5.83	\$188.50
25809	50.80	500.0	4.40	\$184.60
25811	50.80	1000.0	3.70	\$176.80
25903	76.20	100.0	20.24	\$384.80
25905	76.20	200.0	11.19	\$318.50
25907	76.20	1000.0	4.49	\$286.00

Contact DDC TECHNOLOGIES for other size or focal length.



The application of bi-concave lenses is quiet analogous to plano concave lenses (see previous pages) but since every concave surface deliver its contribution to the lens power these kind of lenses can be made with the shorter focal lengthes.

The focal length is equal to the radius of curvature which is the same for the both sides of lens. In such case the focal length is believed the negative (see Fig. 38). In order to know the conditions for which the bi-concave lenses from fused silica is better then ones from borosilicate crown glass see previous pages.

SPECIFICATIONS

Material	UV grade fused silica
Surface quality	40-20 scratch-dig
Optical aperture	90% of the diameter
Diameter tolerance	+0.00, -0.12mm
Thickness tolerance	± 0.2mm
Focal length	± 1%

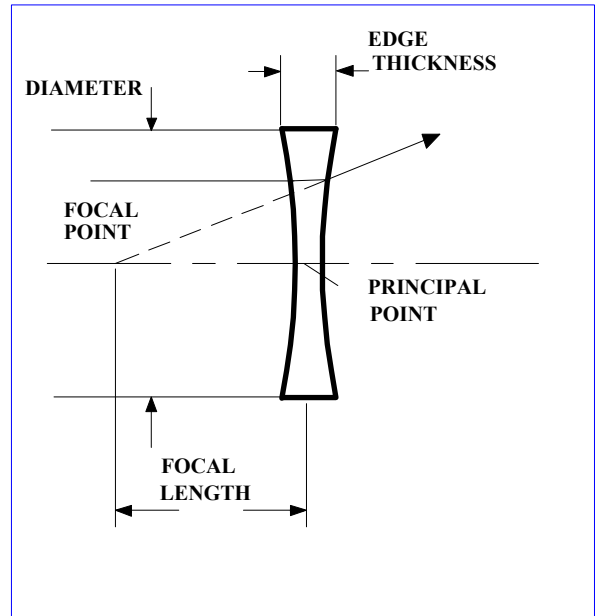


Fig. 38 Bi-concave Lens.

Model	Dia. (mm)	Focal Length (mm)	Edge Thickness (mm)	Price
26405	6.35	-12.7	3.19	\$61.10
26505	12.70	-25.4	3.92	\$61.10
26605	25.40	-50.2	5.36	\$88.40
26607	25.40	-75.6	4.40	\$68.90
26609	25.40	-100.0	3.92	\$68.90
26611	25.40	-150.0	3.45	\$71.50
26613	25.40	-200.0	3.21	\$71.50
26615	25.40	-250.0	3.07	\$76.70
26617	25.40	-1000.0	2.64	\$88.40
26705	50.80	-100.0	8.25	\$227.50
26707	50.80	-150.0	6.31	\$198.90
26709	50.80	-250.0	4.77	\$188.50
26711	50.80	-500.0	3.64	\$188.50
26713	50.80	-1000.0	3.07	\$188.50

Contact DDC TECHNOLOGIES for other size or focal length.

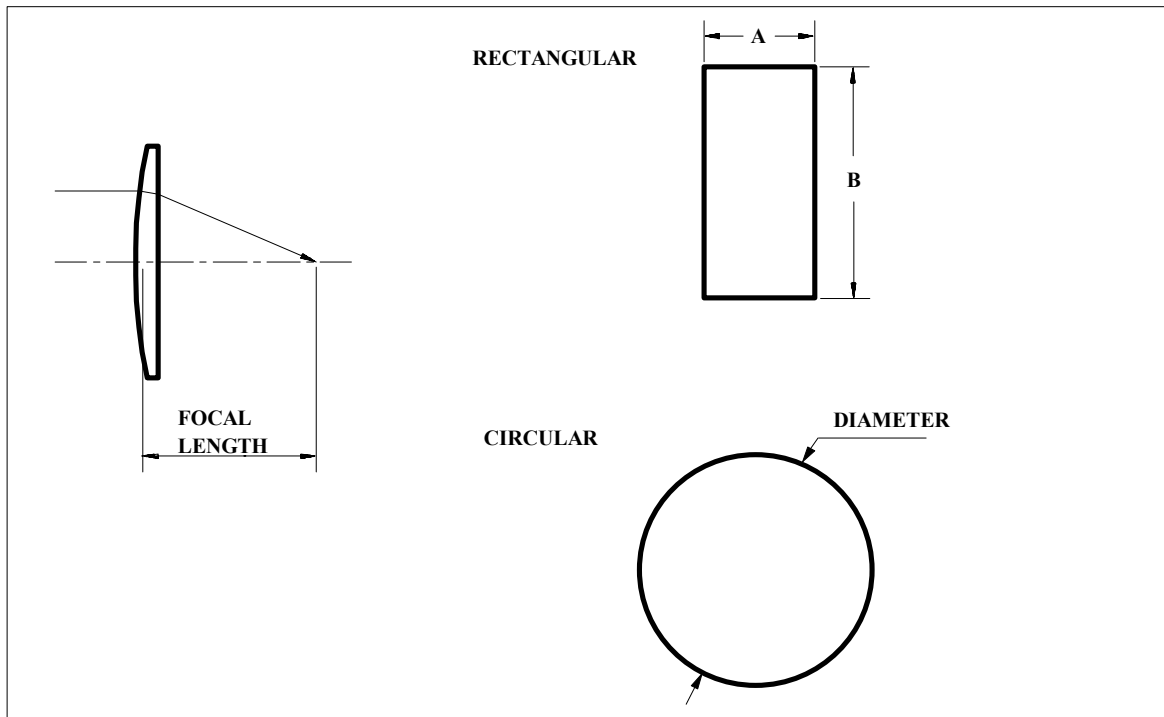


Fig. 39 Cylindrical Lenses.



Spherical lenses have equal magnification in any direction. Instead of that cylindrical lenses have magnification only in one plane. These lenses convert circular beam to elliptical and produce a line instead of spot focus. They also are useful in focusing onto monochromator slits or focusing onto linear detector arrays. We offer both rectangular and circular cylindrical lenses (see Fig. 39).

These cylindrical lenses are made from selected grade borosilicate crown glass and are high quality, low cost alternative to fused silica if UV transmittance is not required and thermal shock is not anticipated.

SPECIFICATIONS

Material	BK7
Surface quality	40-20 scratch-dig
Dimension tolerance	+0.00, -0.2mm
Focal length	± 2%

OPTICAL GLASS POSITIVE CYLINDRICAL LENSES

RECTANGULAR

Dimensions (mm)		Focal Length (mm)	Model No	Price
A	B			
19.1	25.4	25	29005	\$58.50
25.4	50.8	50	29010	\$91.00
25.4	50.8	75	29015	\$91.00
25.4	50.8	100	29020	\$91.00
25.4	50.8	150	29025	\$91.00

CIRCULAR

Diameter (mm)	Focal Length (mm)	Model No	Price
19.1	25	29205	\$65.00
25.4	50	29210	\$78.00
50.8	75	29215	\$123.50
50.8	100	29220	\$123.50
50.8	150	29225	\$123.50

Contact DDC TECHNOLOGIES for other size or focal length.



As the optical glass cylindrical lenses these lenses have magnification only in one plane, convert circular beam to elliptical and produce a line instead of spot focus.

These circular and rectangular cylindrical lenses are made from the UV grade optical quality fused silica with approximately 85% transmission at 190 nm, low coefficient of expansion and high thermal conductivity. That helps prevent breakage and thermal distortion.

SPECIFICATIONS

Material	UV grade fused silica.
Surface quality	40-20 scratch-dig
Dimension tolerance	+0.00, -0.2mm
Focal length	± 2%

FUSED SILICA POSITIVE CYLINDRICAL LENSES

RECTANGULAR

Dimensions (mm)		Focal Length (mm)	Model No	Price
A	B			
19.1	25.4	25	29105	\$136.50
25.4	50.8	50	29110	\$227.50
25.4	50.8	75	29115	\$223.60
25.4	50.8	100	29120	\$223.60
25.4	50.8	150	29125	\$223.60

CIRCULAR

Diameter (mm)	Focal Length (mm)	Model No	Price
19.1	25	29305	\$104.00
25.4	50	29310	\$123.50
50.8	75	29315	\$231.40
50.8	100	29320	\$230.10
50.8	150	29325	\$230.10

Contact DDC TECHNOLOGIES for other size or focal length.

