

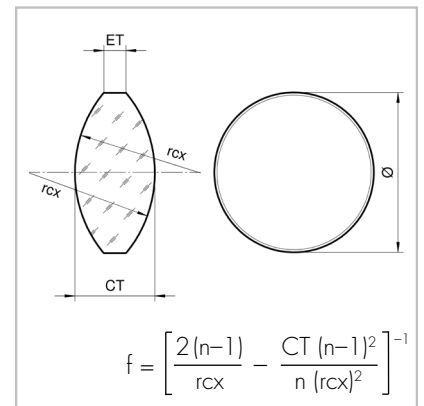
Biconvex and Biconcave Lenses

Biconvex and biconcave lenses are used if a short focal length has to be achieved with a large lens diameter. The refractive power of the lens is achieved by the two radii of curvature r_{cx} and r_{cx} (see also the drawings).

Because both sides of the lens are curved, a single curvature is not as strong as in plano-concave/plano-convex lenses of the same focal length. The aberrations of the biconcave/biconvex lenses are therefore smaller, which is crucial for some applications.

The lenses listed in the table represent only a small portion of our standard program.

In the table, you will find focal length values for commonly used wavelengths.



Biconvex Lenses

Biconvex lenses are so-called positive lenses with two identical radii of curvature. In laser technology, they are primarily used if very short focal lengths are required that cannot be achieved with plano-convex lenses. They are also used in 1:1 imaging, for example, in monitoring systems.

Nomenclature

BICX	-25.4	/51.5	C
Product code (Biconvex Lens)	Diameter in mm	Convex radius of curvature in nm	Material code UV: fused silica C: BK7

Typical Specifications

Material	BK7, fused silica
Diameter tolerance	+ 0.00 mm; - 0.20 mm
Thickness tolerance	± 0.20 mm
Radii tolerance	± 0.5 % for $rcx < 0.5$ m ± 1% for 0.5 m $< rcx < 2$ m
Clear aperture	85 % of diameter
Surface figure Both surfaces	3/-(0.2/-) according to ISO 10110 $\lambda/10$ according to MIL-O-1380A
Surface quality	5/4 x 0.025 for 1.0" substrates according to ISO 10110 10-5 according to MIL-O-1380A
Centering error	4/3' according to ISO 10110
Protective chamfer	0.2 - 0.4 mm x 45°

Fused Silica Biconvex Lenses

Part No.	Nominal f [mm]	Diameter Ø [mm]	f [mm] (248 nm) n = 1.5086	f [mm] (308 nm) n = 1.4856	f [mm] (355 nm) n = 1.4761	f [mm] (1064 nm) n = 1.4496	Curvature rcx [mm]	Center Thickness CT [mm]	Edge Thickness ET [mm]
BICX-10.0/19.7UV	20	10.0	20.2	21.1	21.6	22.8	19.7	4.9	1.9
BICX-12.7/25.4UV	25	12.7	25.3	26.5	27.0	28.6	25.4	3.6	2.0
BICX-25.4/25.4UV	25	25.4	25.3	26.5	27.0	28.6	25.4	9.0	1.7
BICX-25.4/38.1UV	40	25.4	38.5	40.3	41.1	43.5	38.1	6.3	1.9
BICX-12.7/51.0UV	50	12.7	50.6	53.0	54.1	57.2	51.0	2.9	1.8
BICX-25.4/50.6UV	50	25.4	50.6	53.0	54.0	57.2	50.6	5.1	1.9
BICX-25.4/61.0UV	60	25.4	60.7	63.6	64.8	68.6	61.0	4.5	1.8
BICX-12.7/76.3UV	75	12.7	75.4	79.0	80.5	85.3	76.3	2.4	2.1
BICX-25.4/76.3UV	75	25.4	75.7	79.3	80.8	85.6	76.3	4.1	2.0
BICX-10.0/102.7UV	100	10.0	101.3	106.1	108.2	114.6	102.7	2.0	1.8
BICX-15.0/102.4UV	100	15.0	101.1	105.9	108.0	114.3	102.4	2.7	2.2
BICX-12.7/102.5UV	100	12.7	101.3	106.1	108.2	114.5	102.5	3.2	2.3
BICX-25.4/102.4UV	100	25.4	101.3	106.0	108.1	114.5	102.4	3.5	1.9

Other sizes and materials are available upon request.

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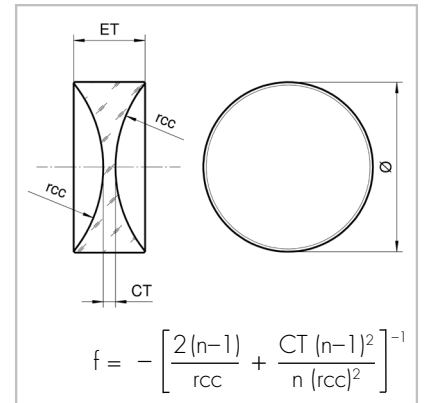
BK7 Biconvex Lenses

Part No.	Nominal f [mm]	Diameter Ø [mm]	f [mm] (488 nm) n = 1.5222	f [mm] (532 nm) n = 1.5195	f [mm] (633 nm) n = 1.5151	f [mm] (1064 nm) n = 1.5066	Curvature r _{cx} [mm]	Center Thickness CT [mm]	Edge Thickness ET [mm]
BICX-19.1/29.8C	30	19.1	29.6	29.8	30.0	30.5	29.8	6.3	3.2
BICX-38.1/37.0C	38	38.1	37.6	37.8	38.1	38.7	37.0	12.4	1.8
BICX-25.4/50.6C	50	25.4	49.3	49.6	50.0	50.8	50.6	5.1	1.9
BICX-15.0/61.3C	60	15.0	59.1	59.5	60.0	60.9	61.3	2.7	1.8
BICX-25.4/76.6C	75	25.4	74.0	74.4	75.0	76.3	76.6	4.1	2.0
BICX-15.0/102.6C	100	15.0	98.7	99.2	100.0	101.7	102.6	2.7	2.2
BICX-25.4/257.1C	250	25.4	246.6	247.9	250.0	254.2	257.1	2.7	2.1
BICX-25.4/411.5C	400	25.4	394.4	396.5	399.8	406.5	411.5	2.4	2.0

Other sizes and materials are available upon request.

Biconcave Lenses

Biconcave lenses are so-called negative lenses with two identical radii of curvature. In laser technology, they are primarily used if very short negative focal lengths are required that cannot be achieved with plano-concave lenses.



Nomenclature

BICC	-25.4	/51.5	C
Product code (Biconcave Lens)	Diameter in mm	Concave radius of curvature in mm	Material code UV: fused silica C: BK7

Typical Specifications

Material	BK7, fused silica
Diameter tolerance	+ 0.00 mm; - 0.20 mm
Thickness tolerance	± 0.20 mm
Radii tolerance	± 0.5 % for rcc < 0.5 m ± 1% for 0.5 m < rcc < 2 m
Clear aperture	85 % of diameter
Surface figure Both surfaces	3/-(0.2/-) according to ISO 10110 $\lambda/10$ according to MIL-O-1380A
Surface quality	5/4 x 0.025 for 1.0" substrates according to ISO 10110 10-5 according to MIL-O-1380A
Centering error	4/3' according to ISO 10110
Protective chamfer	0.2 - 0.4 mm x 45°

Fused Silica Biconcave Lenses

Part No.	Nominal f [mm]	Diameter Ø [mm]	f [mm] (248 nm) n = 1.5086	f [mm] (308 nm) n = 1.4856	f [mm] (355 nm) n = 1.4761	f [mm] (1064 nm) n = 1.4496	Curvature rcc [mm]	Center Thickness CT [mm]	Edge Thickness ET [mm]
BICC-12.7/10.8UV	-10	12.7	-10.3	-10.8	-11.0	-11.7	10.8	2.0	6.1
BICC-12.7/15.0UV	-15	12.7	-14.7	-15.4	-15.8	-16.7	15.0	2.0	4.5
BICC-19.1/20.9UV	-20	19.1	-20.2	-21.2	-21.6	-22.9	20.9	2.0	6.6
BICC-25.0/26.1UV	-25	25.0	-25.3	-26.5	-27.1	-28.7	26.1	2.0	8.4
BICC-12.7/50.0UV	-49	12.7	-49.2	-51.5	-52.5	-55.6	50.0	2.0	2.8
BICC-25.4/50.0UV	-49	25.4	-49.2	-51.5	-52.5	-55.6	50.0	2.5	5.2
BICC-12.7/75.0UV	-74	12.7	-73.7	-77.2	-78.8	-83.4	75.0	2.5	3.0
BICC-25.4/100.0UV	-98	25.4	-98.3	-103.0	-105.0	-111.2	100.0	2.5	4.1
BICC-50.8/100.0UV	-98	50.8	-98.3	-103.0	-105.0	-111.2	100.0	3.0	9.0
BICC-25.4/200.0UV	-197	25.4	-196.6	-205.9	-210.1	-222.4	200.0	3.0	3.8
BICC-50.8/200.0UV	-197	50.8	-196.6	-205.9	-210.1	-222.4	200.0	4.5	7.7

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BK7 Biconcave Lenses

Part No.	Nominal f [mm]	Diameter Ø [mm]	f [mm] (488 nm) n = 1.5222	f [mm] (532 nm) n = 1.5195	f [mm] (633 nm) n = 1.5151	f [mm] (1064 nm) n = 1.5066	Curvature rcc [mm]	Center Thickness CT [mm]	Edge Thickness ET [mm]
BICC-12.7/10.0C	-9	12.7	-9.3	-9.3	-9.4	-9.5	10.0	2.0	6.5
BICC-12.7/25.0C	-24	12.7	-23.6	-23.7	-23.9	-24.3	25.0	2.0	3.6
BICC-25.4/25.0C	-24	25.4	-23.6	-23.7	-23.9	-24.3	25.0	2.0	8.4
BICC-12.7/50.0C	-48	12.7	-47.5	-47.8	-48.2	-49.0	50.0	2.0	2.8
BICC-25.4/50.0C	-48	25.4	-47.5	-47.8	-48.2	-49.0	50.0	2.0	5.3
BICC-25.4/75.0C	-72	25.4	-71.5	-71.9	-72.5	-73.7	75.0	2.0	4.2
BICC-50.8/75.0C	-72	50.8	-71.3	-71.7	-72.3	-73.5	75.0	3.0	11.9
BICC-12.7/100.0C	-97	12.7	-95.4	-95.9	-96.7	-98.4	100.0	2.0	2.4
BICC-25.4/100.0C	-97	25.4	-95.4	-95.9	-96.7	-98.4	100.0	2.0	4.5
BICC-50.8/100.0C	-97	50.8	-95.3	-95.8	-96.6	-98.2	100.0	3.0	9.6
BICC-25.4/150.0C	-145	25.4	-143.1	-143.9	-145.1	-147.5	150.0	3.2	4.3
BICC-25.4/200.0C	-194	25.4	-190.9	-191.9	-193.6	-196.8	200.0	3.4	4.2
BICC-50.8/200.0C	-194	50.8	-191.0	-192.0	-193.7	-196.9	200.0	3.0	6.2
BICC-25.4/300.0C	-291	25.4	-286.7	-288.3	-290.7	-295.6	300.0	3.0	3.5
BICC-25.4/400.0C	-388	25.4	-382.5	-384.5	-387.8	-394.3	400.0	3.0	3.4
BICC-25.4/500.0C	-485	25.4	-478.2	-480.8	-484.9	-492.9	500.0	3.0	3.3

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