

ESK50-B - September 14, 2022

Item # ESK50-B was discontinued on September 14, 2022. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

ACHROMATIC DOUBLETS ESSENTIALS KITS

- ▶ **Steel Cabinet Frame and Protective Metal Case Options**
- ▶ **Available with Three Broadband AR Coating Ranges**
- ▶ **Mounted Lenses in Protective Case or Unmounted Lenses in Steel Cabinet**



ESK50-B
(Unmounted Lenses)



LSB08-A
(Mounted Lenses)



Each Lens and Location is Clearly Marked

[Hide Overview](#)

OVERVIEW

Features

- Cemented Achromatic Doublets Kits
- 14-Piece Mounted Lens or 50-Piece Unmounted Lens Kit
- Storage Cases Included
- AR-Coated Doublets with One of Three Coatings

Thorlabs offers achromatic doublet kits containing either mounted or unmounted optics. The mounted kits (LSB08 Series) contain 14 of our most popular Ø1" cemented achromatic doublets premounted in SM1-compatible lens cells. Unmounted achromatic doublets of varying diameters are included in the 50-piece kits (ESK50 Series).

The most typical application of achromatic doublet lenses is to reduce the chromatic aberration that is symptomatic of spherical lenses as well as to reduce other aberrations such as coma. Other applications of achromatic doublets include the diffraction limited focusing of laser beams and the focusing or imaging of white light within the design wavelength range.

These achromatic doublets are also available individually by visiting our Achromatic Doublet Navigation.

LSB08 Series of Mounted Achromatic Lenses

Our LSB08 kit comes with 14 of our most popular A- (400 - 700 nm), B- (650 - 1050 nm), or C- (1050 - 1620 nm) coated Ø1" achromatic doublets premounted

Achromatic Doublets Selection Guide	
Unmounted Lenses	Mounted Lenses
Visible (400 - 700 nm)	Visible (400 - 700 nm)
Extended Visible (400 - 1100 nm)	Extended Visible (400 - 1100 nm)
Near IR (650 - 1050 nm)	Near IR (650 - 1050 nm)
IR (1050 - 1700 nm)	IR (1050 - 1700 nm)
Achromatic Doublet Kits	



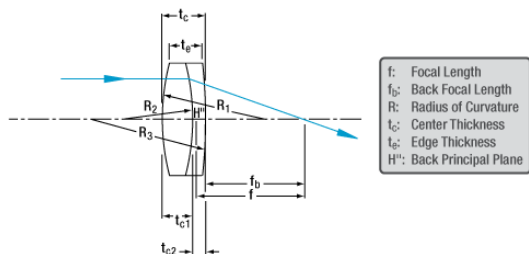
in SM1-compatible (1.035"-40) lens cells. The mounted optics are housed in a plastic case. See the *LSB08 Series* tab for detailed information on the included optics in each kit.

ESK50 Series of Unmounted Achromatic Lenses

The ESK50-B kit includes 50 of our most popular unmounted achromatic doublets housed in a storage case that makes it convenient to accommodate a growing collection of optics. This kit includes optics with a broadband AR coating for 650 - 1050 nm. Detailed information on the included optics can be found under the *ESK50-B* tab. The stackable steel cabinet that houses the unmounted achromatic doublets can be combined with other cabinets in our selection of storage cabinets. Alternatively, the storage cabinet can be integrated into our 19" Rack System.

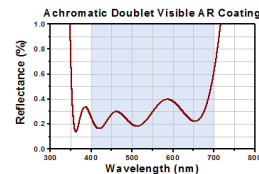
[Hide LSB08 Series](#)

LSB08 SERIES



- f: Focal Length
- f_b : Back Focal Length
- R: Radius of Curvature
- t_c : Center Thickness
- t_e : Edge Thickness
- H' : Back Principal Plane

General Specifications	
Design Wavelength for -A-ML Doublets	486.1 nm, 587.6 nm, 656.3 nm
Design Wavelength for -B-ML Doublets	706.5 nm, 855 nm, 1015 nm
Design Wavelength for -C-ML Doublets	1016 nm, 1330 nm, 1550 nm
Lens Diameter	25.4 mm
Diameter Tolerance	+0.00/-0.10 mm
Mounting Thread	SM1 (1.035"-40)
Focal Length Tolerance	±1%
Surface Quality	40-20 Scratch-Dig
Centration	≤3 arcmin
Clear Aperture	>90% of Diameter
A Coating Range	$R_{avg} < 0.5\%$ over 400 - 700 nm
B Coating Range	$R_{avg} < 0.5\%$ over 650 - 1050 nm
C Coating Range	$R_{avg} < 0.5\%$ over 1050 - 1620 nm
Operating Temperature	-40 to +85 °C

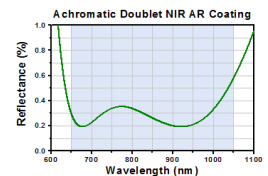


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Contents of LSB08-A Kit^a

Item #	f (mm)	f _b (mm)	r ₁ (mm)	r ₂ (mm)	r ₃ (mm)	t _{c1} (mm)	t _{c2} (mm)	t _e (mm)	Materials ^b
AC254-030-A-ML	30	22.9	20.89	-16.73	-79.8	12	2	8.8	N-BAF10/N-SF6HT
AC254-035-A-ML	35	27.3	23.99	-19.1	-102.09	12	2	9.6	N-BAF10/N-SF6HT
AC254-040-A-ML	40	33.4	23.66	-20.09	-57.68	10	2.5	7.4	N-BK7/SF5
AC254-045-A-ML	45	40.2	31.24	-25.94	-130.62	7	2	5.7	N-BAF10/N-SF6HT
AC254-050-A-ML	50	43.4	33.34	-22.28	-291.07	9	2.5	8.7	N-BAF10/N-SF10
AC254-060-A-ML	60	54.3	41.69	-25.88	-230.7	8	2.5	8.2	E-BAF11/FD10
AC254-075-A-ML	75	70.3	46.54	-33.91	-95.54	7	2.5	6.9	N-BK7/SF5
AC254-100-A-ML	100	97.1	62.75	-45.71	-128.23	4	2.5	4.7	N-BK7/SF5
AC254-150-A-ML	150	146.1	91.62	-66.68	-197.7	5.7	2.2	6.6	N-BK7/SF5
AC254-200-A-ML	200	194	77.4	-87.57	291.07	4	2.5	5.7	N-SSK5/LAFN7
AC254-250-A-ML	250	246.7	137.09	-111.51	-459.2	4	2	5.2	N-BK7/SF2
AC254-300-A-ML	300	297	165.2	-137.09	-557.4	4	2	5.4	N-BK7/SF2
AC254-400-A-ML	400	396	219.8	-181.55	-738.5	4	2	5.5	N-BK7/SF2
AC254-500-A-ML	500	499.9	337.3	-186.75	-557.4	4	2	5.6	N-BK7/SF2

- a. LSB08 kits include 14 achromatic doublets individually mounted in a Ø1" SM1-threaded mount. Each kit comes with one (1) of each listed lens.
- b. Substrate materials often have multiple names, which vary depending upon the supplier of the bulk material. Most of the materials listed are the Schott glass type with the exception of E-BAF11 (Hikari) and FD10 (Hoya).



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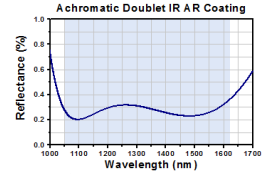
Contents of LSB08-B Kit^a

Item #	f (mm)	f _b (mm)	r ₁ (mm)	r ₂ (mm)	r ₃ (mm)	t _{c1} (mm)	t _{c2} (mm)	t _e (mm)	Materials ^b
AC254-030-B-ML	30	23	21.09	-16.18	-79.08	12	1.5	8.2	N-BAF10/N-SF6HT
AC254-035-B-ML	35	28.4	23.99	-18.62	-97.27	10.5	1.5	7.5	N-BAF10/N-SF6HT
AC254-040-B-ML	40	32.8	26.12	-21.28	-137.09	10	2.5	8.6	N-BAF10/N-SF6HT
AC254-045-B-ML	45	39.6	29.38	-25.05	-127.06	7.8	1.6	5.9	N-LAK22/N-SF6HT
AC254-050-B-ML	50	45	33.55	-27.05	-125.6	7.5	1.8	6.2	N-LAK22/N-SF6HT
AC254-060-B-ML	60	55.8	39.48	-33	-165.2	6	1.7	5.1	N-LAK22/N-SF6HT
AC254-075-B-ML	75	69.9	36.9	-42.17	417.8	5	1.6	4.5	N-BAF10/N-SF6HT
AC254-100-B-ML	100	97.1	66.68	-53.7	-259.41	4	1.5	4	N-LAK22/N-SF6HT
AC254-150-B-ML	150	144.6	83.6	-89.33	-1330.5	4	3.5	6.5	N-LAK22/N-SF6HT
AC254-200-B-ML	200	194.8	106.41	-96.61	2000	4	4	7.3	N-LAK22/N-SF10
AC254-250-B-ML	250	237.5	52	-65.31	111.51	4	1.5	4.7	SF5/N-SF6HT
AC254-300-B-ML	300	290	62.4	-77.4	134	4	2	5.3	SF5/N-SF6HT
AC254-400-B-ML	400	391.1	83.6	-106.41	181.55	3.5	1.8	4.8	SF5/N-SF6HT
AC254-500-B-ML	500	480.8	60.6	-62.75	87.57	4	2	5.6	N-SF10/N-SF6HT

- a. LSB08 kits include 14 achromatic doublets individually mounted in a Ø1" SM1-threaded mount. Each kit comes with one (1) of

each listed lens.

- b. Substrate materials often have multiple names, which vary depending upon the supplier of the bulk material. The names listed here are the Schott glass types.



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Contents of LSB08-C Kit^a

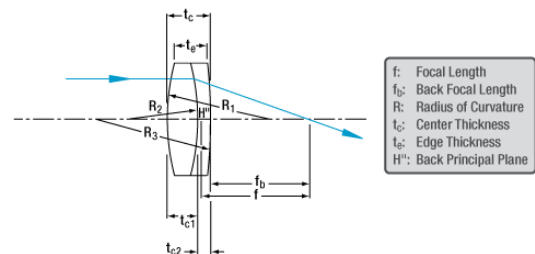
Item #	f (mm)	f _b (mm)	r ₁ (mm)	r ₂ (mm)	r ₃ (mm)	t _{c1} (mm)	t _{c2} (mm)	t _e (mm)	Materials ^b
AC254-030-C-ML	30	22.2	21.09	-15.24	-71.12	13	1.8	9.4	N-BAF10/N-SF6HT
AC254-035-C-ML	35	27.4	23.15	-17.87	-105.2	11.5	1.8	8.7	N-BAF10/N-SF6HT
AC254-040-C-ML	40	32.8	24.43	-21.09	-143.92	10	1.8	7.7	N-LAK22/N-SF6HT
AC254-045-C-ML	45	36.7	22.94	-23.66	900	9.6	1.8	7.7	N-LAK22/N-SF6HT
AC254-050-C-ML	50	41.2	22.94	-25.88	194.54	9	1.8	7.4	N-LAK22/N-SF6HT
AC254-060-C-ML	60	50.5	23.88	-28.12	112.08	8.3	1.8	7.2	N-LAK22/N-SF6HT
AC254-075-C-ML	75	64.9	26.36	-29.38	84.92	7.6	1.8	7.1	N-BAF10/N-SF6HT
AC254-100-C-ML	100	90.3	32.14	-38.02	93.54	6.5	1.8	6.6	N-BAF10/N-SF6HT
AC254-150-C-ML	150	140.6	42.69	-52	111.51	5	2.5	6.3	N-BAF10/N-SF6HT
AC254-200-C-ML	200	193.1	70	-95.94	274.31	4	3	6.1	N-LAK22/N-SF6HT
AC254-250-C-ML	250	235.3	43.95	-57.68	93.11	4.5	2.5	6	SF2/N-SF6HT
AC254-300-C-ML	300	285.9	52.48	-68.54	112.21	4.5	2.5	6.2	SF2/N-SF6HT
AC254-400-C-ML	400	386.8	70	-93.11	151.36	4.2	2.5	6.1	SF2/N-SF6HT
AC254-500-C-ML	500	486.9	87.9	-115.45	194.54	3.5	2	5	SF2/N-SF6HT

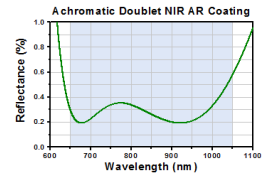
- a. LSB08 kits include 14 achromatic doublets individually mounted in a Ø1" SM1-threaded mount. Each kit comes with one (1) of each listed lens.
- b. Substrate materials often have multiple names, which vary depending upon the supplier of the bulk material. The names listed here are the Schott glass types.

[Hide ESK50-B](#)

ESK50 - B

General Specifications	
Design Wavelengths	706.5 nm, 855 nm, 1015 nm
Diameter Tolerance	+0.00/-0.10 mm
Focal Length Tolerance	±1%
Surface Quality	40-20 Scratch-Dig
Centration	<3 arcmin
Clear Aperture	>90% of Diameter
B Coating Range	R _{avg} <0.5% from 650 - 1050 nm
Operating Temperature	-40 to +85 °C





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Contents of ESK501-B Kit

The ESK50-B kit includes 50 unmounted achromatic doublets in a range of diameters. The kit comes with one (1) of each listed lens.

Positive IR Achromats: Infinite Conjugate Ratio

Item #	Dia. (mm)	f (mm)	f _b (mm)	r ₁ (mm)	r ₂ (mm)	r ₃ (mm)	t _{c1} (mm)	t _{c2} (mm)	t _e (mm)	Materials ^a
AC050-008-B	5	7.5	4.8	4.61	-3.9	-35.95	2.8	1.8	3.8	N-BAF10/N-SF6HT
AC050-010-B	5	10	8	6.55	-5.25	-24.89	2.2	1.6	3.2	N-LAK22/N-SF6HT
AC050-015-B	5	15	13	10.28	-7.59	-32.14	2.3	1.7	3.6	N-LAK22/N-SF6HT
AC060-010-B	6	10	8.1	7.08	-5.25	-19.54	2.5	1.5	2.3	N-LAK22/N-SF6HT
AC064-013-B	6.35	12.7	10.7	8.6	-6.67	-28.97	2.5	1.4	3.1	N-LAK22/N-SF6HT
AC064-015-B	6.35	15	13.1	10.28	-7.75	-32.89	2.4	1.5	3.2	N-LAK22/N-SF6HT
AC080-010-B	8	10	7	7.55	-4.61	-30.62	4.5	1.3	4.4	N-LAK10/N-SF6HT
AC080-016-B	8	16	14	11.02	-8.6	-35.81	2.5	1.5	3	N-LAK22/N-SF6HT
AC080-020-B	8	20	18.2	13.53	-10.59	-47.75	2.3	1.3	2.8	N-LAK22/N-SF6HT
AC127-019-B	12.7	19	15.5	12.16	-10.59	-77.4	4.5	1.5	3.9	N-BAF10/N-SF6HT
AC127-025-B	12.7	25	21.1	16.18	-13.31	-68.54	5	2	5.4	N-LAK22/N-SF6HT
AC127-030-B	12.7	30	27.3	19.82	-16.18	-79.08	3.5	1.5	3.7	N-LAK22/N-SF6HT
AC127-050-B	12.7	50	46.2	24.2	-26.79	250	3.5	1.5	4.2	N-BAF10/N-SF6HT
AC127-075-B	12.7	75	72	36.22	-40.36	398.1	2.5	1.5	3.5	N-BAF10/N-SF6HT
AC254-030-B	25.4	30	23	21.09	-16.18	-79.08	12	1.5	8.2	N-BAF10/N-SF6HT
AC254-035-B	25.4	35	28.4	23.99	-18.62	-97.27	10.5	1.5	7.5	N-BAF10/N-SF6HT
AC254-040-B	25.4	40	32.8	26.12	-21.28	-137.09	10	2.5	8.6	N-BAF10/N-SF6HT
AC254-045-B	25.4	45	39.6	29.38	-25.05	-127.06	7.8	1.6	5.9	N-LAK22/N-SF6HT
AC254-050-B	25.4	50	45	33.55	-27.05	-125.6	7.5	1.8	6.2	N-LAK22/N-SF6HT
AC254-060-B	25.4	60	55.8	39.48	-33	-165.2	6	1.7	5.1	N-LAK22/N-SF6HT
AC254-075-B	25.4	75	69.9	36.9	-42.17	417.8	5	1.6	4.5	N-BAF10/N-SF6HT
AC254-100-B	25.4	100	97.1	66.68	-53.7	-259.41	4	1.5	4	N-LAK22/N-SF6HT
AC254-150-B	25.4	150	144.6	83.6	-89.33	-1330.5	4	3.5	6.5	N-LAK22/N-SF6HT
AC254-200-B	25.4	200	194.8	106.41	-96.61	2000	4	4	7.3	N-LAK22/N-SF10
AC254-250-B	25.4	250	237.5	52	-65.31	111.51	4	1.5	4.7	SF5/N-SF6HT
AC254-300-B	25.4	300	290	62.4	-77.4	134	4	2	5.3	SF5/N-SF6HT
AC254-400-B	25.4	400	391.1	83.6	-106.41	181.55	3.5	1.8	4.8	SF5/N-SF6HT
AC254-500-B	25.4	500	480.8	60.6	-62.75	87.57	4	2	5.6	N-SF10/N-SF6HT
AC300-050-B	30	50	42.9	30.76	-27.86	-272.9	9.5	2	7.2	N-BAF10/N-SF6HT
AC300-080-B	30	80	75.3	52.48	-42.69	-216.3	6.5	2	5.8	N-LAK22/N-SF6HT
AC300-100-B	30	100	94	49.09	-55.34	557.4	6	2	5.9	N-BAF10/N-SF6HT
AC508-075-B	50.8	75	65.7	51.8	-93.11	-291.07	12	5	9.2	N-LAK22/N-SF6HT
AC508-080-B	50.8	80	69.5	51.8	-44.6	-312.6	16	2	10.3	N-BAF10/N-SF6HT
AC508-100-B	50.8	100	91.5	65.77	-55.98	-280.55	13	2	8.7	N-LAK22/N-SF6HT
AC508-150-B	50.8	150	145.3	112.21	-95.94	-325.1	8.2	5	9.3	N-LAK22/N-SF6HT

AC508-200-B	50.8	200	193.2	134	-109.2	-515.2	8.2	5	10.1	N-LAK22/N-SF6HT
AC508-250-B	50.8	250	252.3	121.22	-146.14	1235.9	6.6	2.6	6.8	N-BAF10/N-SF6HT
AC508-300-B	50.8	300	295.1	201.8	-161.5	-760	6.6	2.6	7.2	N-LAK22/N-SF6HT
AC508-400-B	50.8	400	393.6	280.55	-208	-859	4.5	2.6	5.6	N-LAK22/N-SF6HT
AC508-500-B	50.8	500	497	346.7	-259.41	-1132.4	4.5	2.6	5.9	N-LAK22/N-SF6HT
AC508-750-B	50.8	750	744.8	376.8	-291.07	2910	4.2	2.5	6	N-BAF10/N-SF10
AC508-1000-B	50.8	1000	993.4	494.3	-398.1	3440	4.2	2.8	6.4	N-BAF10/N-SF10

- a. Substrate materials often have multiple names, which vary depending upon the supplier of the bulk material. The names listed here are the Schott glass types.

Negative IR Achromats: Infinite Conjugate Ratio

Item #	Dia. (mm)	f (mm)	f _b (mm)	r ₁ (mm)	r ₂ (mm)	r ₃ (mm)	t _{c1} (mm)	t _{c2} (mm)	t _e (mm)	Materials ^a
ACN127-020-B	12.7	-20	-22.5	-12.34	14.03	152.76	1.5	3	6.4	N-BAF10/N-SF6HT
ACN127-025-B	12.7	-25	-27.7	-13.58	17.13	-859	1.5	2.8	5.9	N-BAF10/N-SF6HT
ACN127-030-B	12.7	-30	-32	-19.25	18.41	106.41	1.5	2.5	5.3	N-LAK22/N-SF6HT
ACN127-050-B	12.7	-50	-52.5	-24.43	30.41	-291.07	1.5	2	4.3	N-BAF10/N-SF6HT
ACN254-040-B	25.4	-40	-43.4	-24.43	27.86	332.3	2	4	9.8	N-BAF10/N-SF6HT
ACN254-050-B	25.4	-50	-53.8	-27.05	33.91	-1330.5	2	4	9.1	N-BAF10/N-SF6HT
ACN254-075-B	25.4	-75	-78.9	-37.15	46.4	-494.3	2	3.8	7.9	N-BAF10/N-SF6HT
ACN254-100-B	25.4	-100	-103.9	-48.75	59.02	-580.8	2	3.4	6.9	N-BAF10/N-SF6HT

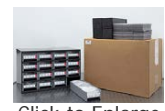
- a. Substrate materials often have multiple names, which vary depending upon the supplier of the bulk material. The names listed here are the Schott glass types.

[Hide Smart Pack](#)

SMART PACK

Smart Pack Goals

- Reduce Weight of Packaging
- Increase Usage of Recyclable Materials
- Improve Packing Integrity
- Decrease Shipping Costs



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Updated ESK50-B
Packaging

Thorlabs' Smart Pack Initiative is aimed at minimizing waste while providing adequate protection for our products. By eliminating any unnecessary packaging, implementing design changes, and utilizing eco-friendly materials, this initiative seeks to reduce the environmental impact of our product packaging.

The updated ESK50-B packaging consists of recycled paper plus minimal foam and plastic wrap. It weighs 83% less than the original packaging. This weight change results in up to a 13.37 kg reduction in travel-based CO₂ emissions per year, based on typical product sales.

As we move through our product line, we will indicate re-engineered, eco-friendly packaging with our Smart Pack logo, which can be seen above.

[Hide Achromatic Lens Sets \(Mounted Optics\)](#)

Achromatic Lens Sets (Mounted Optics)

LSB08 Series

Mounted Ø1" Achromatic Doublets in Protective Metal Case

Three Broadband Antireflection Coatings: 400-700 nm (A Coating), 650-1050 nm (B Coating), 1050-1620 nm (C Coating)

14 Achromatic Doublets in Each Kit*

Ø1", Mounted in Engraved SM1-Threaded Lens Tubes



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Focal Lengths from 30 mm to 500 mm

*Please refer to the *LSB08 Series* Tab for specific information on the included lenses

Part Number	Description	Price	Availability
LSB08-A	Mounted Ø1" Achromatic Lens Kit, AR Coating: 400 - 700 nm	\$1,476.31	Today
LSB08-B	Mounted Ø1" Achromatic Lens Kit, AR Coating: 650 - 1050 nm	\$1,634.92	Today
LSB08-C	Mounted Ø1" Achromatic Lens Kit, AR Coating: 1050 - 1620 nm	\$1,736.97	Today

[Hide Achromatic Essentials Kits \(Unmounted Optics\)](#)

Achromatic Essentials Kits (Unmounted Optics)

ESK50 Series

Unmounted Achromatic Doublets in Steel Storage Cabinet

Two Broadband Antireflection Coatings: 400- 700 nm (A coating), 650 - 1050 nm (B coating)

50 Achromatic Doublets in Each Kit*

Sizes from Ø5.0 mm to Ø50.8 mm

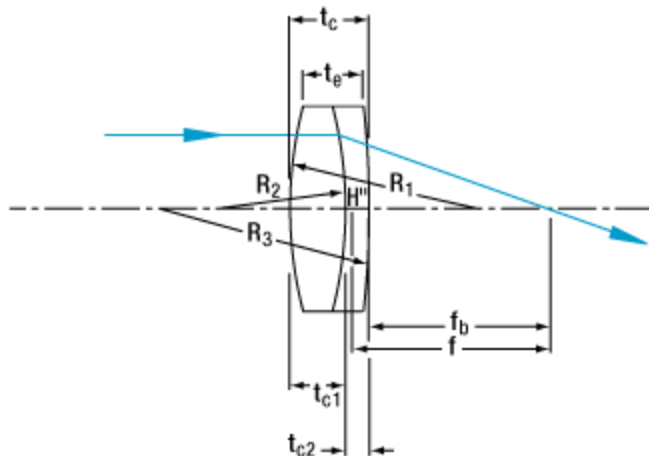
Focal Lengths from 7.5 mm to 1000.0 mm



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*Please refer to the *ESK50-B* Tab for specific information on the included lenses

Part Number	Description	Price	Availability
ESK50-B	Achromatic Lens Essentials Kit, AR Coating: 650 - 1050 nm	\$4,289.16	Lead Time



- f: Focal Length
- f_b : Back Focal Length
- R: Radius of Curvature
- t_c : Center Thickness
- t_e : Edge Thickness
- H'' : Back Principal Plane



Achromatic Doublet NIR AR Coating

