EKSMA OPTICS

ZOOM BEAM EXPANDER

- Adjustable expansion ratio
- Adjustable divergence
- Galilean design

EKSMA OPTICS offers compact Galilean type zoom beam expanders for Nd:YAG lasers fundamental and harmonics wavelength: 1064 nm, 532 nm and 355 nm.

Zoom beam expander provides variable expansion ratio of 2x-8x, 1x-8x, 1x-3x with adjustable focus to correct for laser beam divergence.

Catalogue number	Wavelength, nm	Expantion ratio	Input Clear Aperture, mm	Output Clear Aperture, mm	Length, mm	Price, EUR
165-0281	1064	2x-8x	10	30	142-149	500
165-1181*	1064	1x-8x	12	32	167-202	650
165-0131	1064	1x-3x	14	29	117	650
165-1282*	532	2x-8x	12	32	186.7	650
165-1182*	532	1x-8x	12	32	162-196	850
165-0132	532	1x-3x	10	20	85	650
165-1283*	355	2x-8x	12	32	157-191	800
165-1183*	355	1x-8x	12	32	180.3	1100

** made of quartz; other zoom beam expanders are made of BK7*

Drawings are available upon request.

RELATED PRODUCT

Universal Adjustable Optics Mount 830-0035

See page 8.49

SIMPLE TELESCOPE KIT

Simple lenses are subject to optical aberrations. In many cases these aberrations can be compensated for to a great extent by using a combination of simple lenses with complementary aberrations. A compound lens is a collection of simple lenses of different shapes and made of materials of different refractive indices, arranged one after the other with a common axis.

If two thin lenses are separated in air by some distance d (where d is smaller than the focal length of the first lens), the focal length for the combined system is given by

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{d}{f_1 \cdot f_2}$$

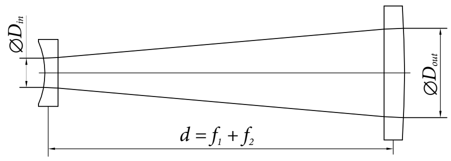
The distance from the second lens to the focal point of the combined lenses is called the back focal length (BFL).

$$BFL = \frac{f_2 \cdot (d - f_1)}{d - (f_1 + f_2)}$$

If the separation distance is equal to the sum of the focal lengths ($d = f_1 + f_2$), the combined focal length and BFL are infinite. This corresponds to a pair of lenses that transform a parallel (collimated) beam into another collimated beam. This type of system is called an afocal system, since it produces no net convergence or divergence of the beam. Two lenses at this separation form the simplest type of optical telescope. Although the system does not alter the divergence of a collimated beam, it does alter the width of the beam. The magnification of such a telescope is given by

$$M = -\frac{f_2}{f_1} = \frac{D_{out}}{D_{in}} \quad \frac{\text{(exit diameter)}}{\text{(input diameter)}}$$

which is the ratio of the input beam width to the output beam width. Note the sign convention: a telescope with two convex lenses ($f_1 > 0, f_2 > 0$) produces a negative magnification, indicating an inverted image. A concave plus a convex lens ($f_1 < 0 < f_2$) produces a positive magnification and the image is upright.



Lens material: BK7

Lens 1	Focal length f_1, mm	Lens 2	Focal length f_2, mm	Distance between lenses $d=f_1+f_2$, mm	Magnification, M
BK7 bi/cv Ø12.7 mm **114-0104**	-12.7	BK7 pl/cx Ø50.8 mm			
		110-0502	+75	62	5.9
		110-0505	+100	87	7.7
		110-0507	+150	137	11.8
		110-0509	+200	187	15.7
		110-0511	+250	237	19.7
BK7 bi/cv Ø25.4 mm **114-0204**	-25	BK7 pl/cx Ø50.8 mm			
		110-0502	+75	50	3
		110-0505	+100	75	4
		110-0507	+150	125	6
		110-0509	+200	175	8
		110-0511	+250	225	10
BK7 pl/cv Ø25.4 mm **112-0209**	-50	BK7 pl/cx Ø50.8 mm			
		110-0502	+75	25	1.5
		110-0505	+100	50	2
		110-0507	+150	100	3
		110-0509	+200	150	4
		110-0511	+250	200	5

Lens material: UVFS

Lens 1	Focal length f_1, mm	Lens 2	Focal length f_2, mm	Distance between lenses $d=f_1+f_2$, mm	Magnification, M
UVFS bi/cv Ø12.7 mm **114-1104**	-12.7	UVFS pl/cx Ø50.8 mm			
		110-1505	+75	62	5.9
		110-1509	+100	87	7.7
		110-1511	+150	137	11.8
		110-1515	+200	187	15.7
		110-1517	+250	237	19.7
UVFS bi/cv Ø25.4 mm **114-1204**	-25	UVFS pl/cx Ø50.8 mm			
		110-1505	+75	50	3
		110-1509	+100	75	4
		110-1511	+150	125	6
		110-1515	+200	175	8
		110-1517	+250	225	10
UVFS pl/cv Ø25.4 mm **112-1205**	-50	UVFS pl/cx Ø50.8 mm			
		110-1505	+75	25	1.5
		110-1509	+100	50	2
		110-1511	+150	100	3
		110-1515	+200	150	4
		110-1517	+250	200	5

Note that distance between lenses d is the distance between focal planes of the lenses and is given theoretically (the thickness of lenses is not included into calculation). It, also, depends on wavelength. The distance should be adjusted ±10 mm in each particular case.

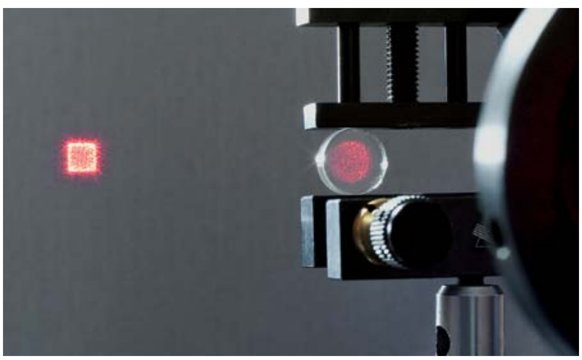
Each kit includes 8 lenses, Aluminium Optical Rail 810-0005-02, two Aluminium Rail Carriers 810-0007-06, Self Centering Lens Mounts 830-0010 and 830-0020, two Rod Holders 820-0050-02 and two Rods 820-0010-02.

Net weight: 1.4 kg

Code	Material	Coating	**Price,** EUR
140-0008	BK7	Uncoated	771
141-0008	BK7	1064 nm, R<0.2%	1075
142-0008	BK7	532 nm + 1064 nm, R<0.5%	1110
147-0008	BK7	400-700 nm, R<0.9%	1260
140-1008	UV FS	Uncoated	1170
144-1008	UV FS	266 nm, R<0.4%	1470
149-1008	UV FS	266 nm + 355 nm, R<0.6%	1480
146-1008	UV FS	210-400 nm, R<1.5%	1680
143-1008	UV FS	355 nm, R<0.25%	1465
141-1008	UV FS	532 nm + 1064 nm, R<0.5%	1485
145-1008	UV FS	350-900 nm, R<1.5%	1685
148-1008	UV FS	650-950 nm, R<1%	1645

Any other antireflection coating wavelength region is available on request.

GAUSS-TO-TOP HAT BEAM SHAPING LENS



Gauss-to-Top Hat Beam Shaping Lens is special form lens used to distribute energy of Gaussian beam to Top Hat profile.

LENS SPECIFICATIONS

Material	LF5 Schott glass n = 1.5659 @ 1060 nm, n = 1.5848 @ 546 nm, n = 1.6192 @ 365 nm
Clear aperture	Ø11.0 mm
Damage threshold (uncoated)	>3 J/cm^2 @ 532 nm, 10 ns
Mounting	Mounted in to 1” ring holder