PRODUCT SPOTLIGHT

TECHSPEC® LC BEAM EXPANDERS

- Designed for YAG Laser Wavelengths
- Compact Form Factor
- Multiple Fixed Magnifications Available from 2X-10X
- Diffraction Limited Performance
- Designed for Laser Material Processing
- 2-Element Galilean Design
- Ideal for OEM Integration

TECHSPEC® 355nm LC FIXED YAG BEAM EXPANDERS *Expands to second diameter

Wavelength (nm)	Nominal Magnification	Entrance Aperture (mm)	Exit Aperture (mm)	Overall Length (mm)	Housing Diameter (mm)	Stock No.
355	2X	3.5	5.2	16.4	29.95	#34-571
355	3X	3.5	12	33.2	29.95	#34-574
355	4X	3.5	8	56.6	29.95	#34-577
355	5X	3.5	10	50.3	29.95	#34-581
355	6X	3.5	16	61.5	29.95	#34-584
355	6.67X	3.5	22	86.1	29.95	#34-587
355	8X	3.7	27	105.2	29.95/39.95*	#34-590
355	9.72X	3.5	22	155.4	29.95	#34-596

TECHSPEC® 532nm LC FIXED YAG BEAM EXPANDERS *Expands to second diameter

Wavelength (nm)	Nominal Magnification	Entrance Aperture (mm)	Exit Aperture (mm)	Overall Length (mm)	Housing Diameter (mm)	Stock No.
532	2X	3.5	5.2	20.3	29.95	#34-572
532	3X	3.5	12	34.2	29.95	#34-575
532	4X	5	10	58.6	29.95	#34-579
532	5X	3.5	10	51.9	29.95	#34-582
532	6X	3.5	16	63.5	29.95	#34-585
532	7.08X	3.5	21	76.4	29.95	#34-588
532	8X	3.7	27	108.8	29.95/39.95*	#34-591
532	10X	3.5	27	111.6	29.95/39.95*	#34-597

TECHSPEC® 1064nm LC FIXED YAG BEAM EXPANDERS *Expands to second diameter

Wavelength (nm)	Nominal Magnification	Entrance Aperture (mm)	Exit Aperture (mm)	Overall Length (mm)	Housing Diameter (mm)	Stock No.
1064	2X	3.5	5.2	20.6	29.95	#34-573
1064	3X	3.5	12	35.0	29.95	#34-576
1064	4X	5	10	59.9	29.95	#34-579
1064	5X	3.5	10	53.1	29.95	#34-583
1064	6X	3.5	16	65	29.95	#34-585
1064	7.08X	3.5	21	78.2	29.95	#34-589
1064	8X	3.7	27	111.4	29.95/39.95*	#34-591
1064	10X	3.5	27	114.2	29.95/39.95*	#34-598

Contact us for a Stock or Custom Quote Today!

USA: +1-856-547-3488 | **EUROPE:** +44 (0) 1904 788600
ASIA: +65 6273 6644 | **JAPAN:** +81-3-3944-6210

Edmund®
75 YEARS OF OPTICS

www.edmundoptics.com/lc-beam-expanders

ADVANTAGES OF USING BEAM EXPANDERS

$$\phi\ \textit{spot size} = \phi\ \textit{diffraction} + \phi\ \textit{aberration} = \frac{4\lambda M^2 f}{\pi D} + \frac{kD^3}{f^2}$$

- λ is Wavelength
- f is the focal length of your lens
- D is the diameter of the input beam
- k is the index of refraction of your lens
- M^2 is the beam quality factor, this represents the degree of variation from an ideal Gaussian beam

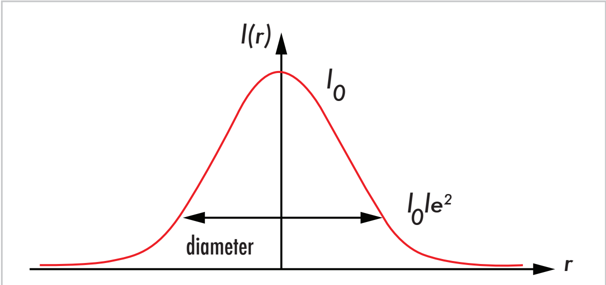

Figure 1. *The spot size is usually defined as the radial distance from the center point of maximum irradiance to point where the intensity drops to* $1/e^2$ *of the initial value.*

Focusing a laser beam down to a small spot is an integral part of many laser optical applications. While some applications benefit from large spot sizes, most require the smallest spot possible.

Spot size is fundamentally determined by the combination of diffraction (red) and aberrations (blue). In this example we can assume that spherical aberration is the dominant aberration, and consider it the only type of aberration. For diffraction, we see that the shorter the focal length, the smaller the spot size. More importantly, the larger the input beam diameter, the smaller the spot size. This shows the advantage of using beam expanders in laser optical applications.

By expanding the beam within the system, the input beam diameter ***D*** is increased by a factor ***m***, reducing the divergence by a factor ***m***. When the beam is finally focused down to a small spot, this spot is a factor of m smaller than for the unexpanded beam for an ideal, diffraction limited spot. There is however a tradeoff with spherical aberration, which increases as the spot size increases.

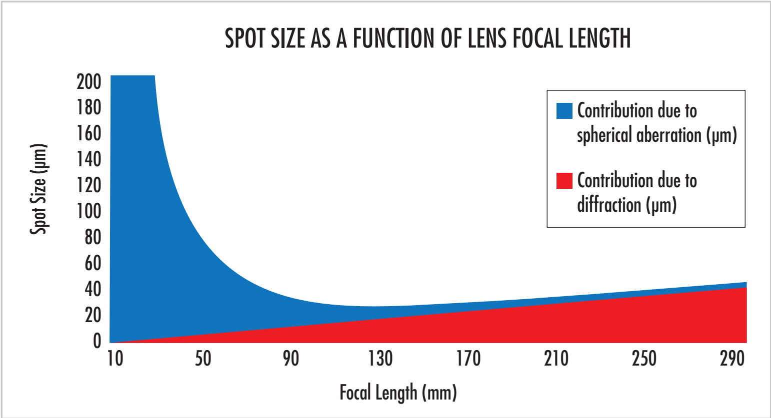

Figure 2. *At short focal lengths, spherical aberrations dominate the spot size. At longer focal lengths, the spot size becomes diffraction limited.*

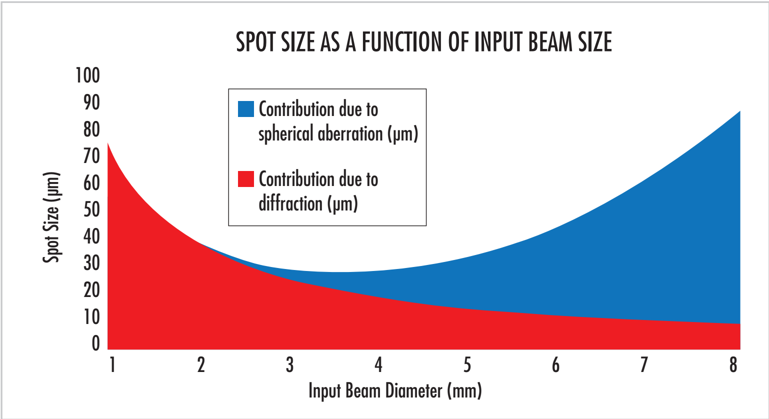

Figure 3. *At small input beam diameters, the spot size is diffraction limited. As the input beam diameter increases, spherical aberration starts to dominate the spot size.*

USA: +1-856-547-3488 | **EUROPE:** +44 (0) 1904 788600
ASIA: +65 6273 6644 | **JAPAN:** +81-3-3944-6210

Edmund® 75 YEARS OF OPTICS
www.edmundoptics.com/lc-beam-expanders