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THORLABS

C610TME-B - November 4, 2022

Item # C610TME-B was discontinued on November 4, 2022. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

MOLDED GLASS ASPHERIC LENSES: 600 - 1050 OR 650 - 1050 nm AR COATING

- **High NA (0.15 to 0.7)**
- **Diffraction-Limited Design**
- **Broadband AR-Coated Optics in Stock**
- **Collimate or Focus Light with a Single Element**

Application Idea

Aspheric Lens in a Fiber Launch Application

A375TM-B

C140TMD-B

A375-B

354140-B

C710TMD-B

354710-B

Hide Overview

OVERVIEW

Features

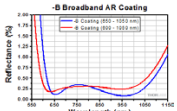
- Molded Glass Aspheric Lenses
- Focus or Collimate Light Without Introducing Spherical Aberration
- Available Unmounted or Pre-Mounted in Nonmagnetic 303 Stainless Steel Lens Cells Engraved with the Item #
- Broadband AR Coating for Either 600 - 1050 nm or 650 - 1050 nm

Webpage Features	
i	Click for complete specifications.
Performance Hyperlink	Click to view item-specific focal length shift data and spot diagrams at various wavelengths.

Zemax Files
Click on the red Document icon next to the item numbers below to access the Zemax file download. Our entire Zemax Catalog is also available.

Aspheric Lens Selection Guide
Uncoated
350 - 700 nm (-A Coating)
600 - 1050 nm (-B Coating)
1050 - 1700 nm (-C Coating)
1.8 - 3 µm (-D Coating)
3 - 5 µm (-E Coating)
8 - 12 µm (-F Coating)
405 nm V-Coating
1064 nm V-Coating

Aspheric lenses focus or collimate light without introducing spherical aberration into the transmitted wavefront. For monochromatic sources, spherical aberration often prevents a single spherical lens from achieving diffraction-limited performance when focusing or collimating light. Aspheric lenses are designed to mitigate the impacts of spherical aberration and are often the best single element solution for many applications including collimating the output of a fiber or laser diode, coupling light into a fiber, spatial filtering, or imaging light onto a detector.



Click to Enlarge
Click Here to Download Raw Data

All of the molded glass lenses featured on this page are available with an antireflection coating for either the 600 - 1050 nm or 650 - 1050 nm range deposited on both sides. Other AR coating options are listed in the Aspheric Lens Selection Guide table at right.

These lenses can be purchased unmounted or premounted in nonmagnetic 303 stainless steel lens cells that are engraved with the Item # for easy identification. All mounted aspheres have a metric thread that make them easy to integrate into an optical setup or OEM application; they can also be readily used with our SM1-threaded (1.035"-40) lens tubes by using our aspheric lens adapters. When combined with our microscope objective adapter extension

tube, mounted aspheres can be used as a drop-in replacement for multi-element microscope objectives.

A selection of the lenses sold on this page are designed for collimating laser diodes. As seen in the tables below, a compatible laser window thickness is listed for these lenses. In these instances, the numerical aperture (NA), working distance (WD), and wavefront error of these lenses are defined based on the presence of a laser window of the indicated thickness (not included).

If an unmounted aspheric lens is being used to collimate the light from a point source or laser diode, the side with the greater radius of curvature (i.e., the flatter surface) should face the point source or laser diode. To collimate light using one of our mounted aspheric lenses, orient the housing so that the externally threaded end of the mount faces the source.

Molded glass aspheres are manufactured from a variety of optical glasses to yield the indicated performance. The molding process will cause the properties of the glass (e.g., Abbe number) to deviate slightly from those given by glass manufacturers. Specific material properties for each lens can be found by clicking on the Info Icon in the tables below and selecting the *Glass* tab.

Hide Fiber Coupling

FIBER COUPLING

Choosing a Lens

Aspheric lenses are commonly chosen to couple incident light with a diameter of 1 - 5 mm into a single mode fiber. A simple example will illustrate the key specifications to consider when trying to choose the correct lens.

Example:
Fiber: P1-630A-FC-2
Collimated Beam Diameter Prior to Lens: Ø3 mm

The specifications for the P1-630A-FC-2, 630 nm, FC/PC single mode patch cable indicate that the mode field diameter (MFD) is 4.3 µm. This specification should be matched to the diffraction-limited spot size given by the following equation:

$$\phi_{spot} = \frac{4\lambda f}{\pi D}$$

Here, *f* is the focal length of the lens, λ is the wavelength of the input light, and *D* is the diameter of collimated beam incident on the lens. Solving for the desired focal length of the collimating lens yields

$$f = \frac{\pi D(MFD)}{4\lambda} = \frac{\pi(0.003\,\mathrm{m})(4.3\times10^{-6}\,\mathrm{m})}{4(630\times10^{-9}\,\mathrm{m})} = 0.016\,\mathrm{m} = 16\,\mathrm{mm}$$

Thorlabs offers a large selection of mounted and unmounted aspheric lenses to choose from. The aspheric lens with a focal length that is closest to 16 mm has a focal length of 15.29 mm (Item # 354260-B or A260-B). This lens also has a clear aperture that is larger than the collimated beam diameter. Therefore, this option is the best choice given the initial parameters (i.e., a P1-630A-FC-2 single mode fiber and a collimated beam diameter of 3 mm). Remember, for optimal coupling, the spot size of the focused beam must be less than the MFD of the single mode fiber. As a result, if an aspheric lens is not available that provides an exact match, then choose one with a focal length that is shorter than the calculation above yields. Alternatively, if the clear aperture of the aspheric lens is large enough, the beam can be expanded before the aspheric lens, which has the result of reducing the spot size of the focus beam.

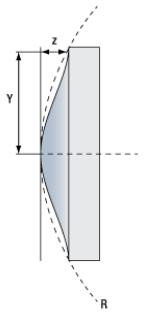
Hide Lens Equation

LENS EQUATION

Aspheric Lens Design Formula

- Positive Radius Indicates that the Center of Curvature is to the Right of the Lens
- Negative Radius Indicates that the Center of Curvature is to the Left of the Lens

Definitions of Variables	
z	Sag (Surface Profile)
Y	Radial Distance from Optical Axis



Click to Enlarge
Reference Drawing

R	Radius of Curvature
k	Conic Constant
A_4	4th Order Aspheric Coefficient
A_6	6th Order Aspheric Coefficient
A_n	*n*th Order Aspheric Coefficient

The target values of these constants are available by clicking on the Info Icons ( ) below or by viewing the .pdf and .dxf files available for each lens. Links to the files can be found by clicking on the part number in the price tables below.

$$z = \frac{Y^2}{R\left(1+\sqrt{1-(1+k)\frac{Y^2}{R^2}}\right)} + A_4Y^4 + A_6Y^6 + \cdots + A_nY^n$$

Aspheric Lens Equation

Hide Collimation Tutorial

COLLIMATION TUTORIAL

Choosing a Collimation Lens for Your Laser Diode

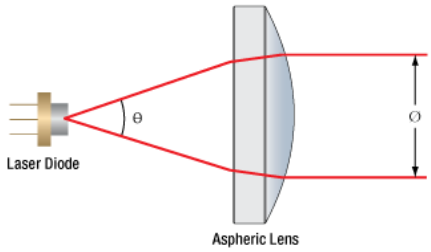
Since the output of a laser diode is highly divergent, collimating optics are necessary. Aspheric lenses do not introduce spherical aberration and are therefore are commonly chosen when the collimated laser beam is to be between one and five millimeters. A simple example will illustrate the key specifications to consider when choosing the correct lens for a given application. The second example below is an extension of the procedure, which will show how to circularize an elliptical beam.

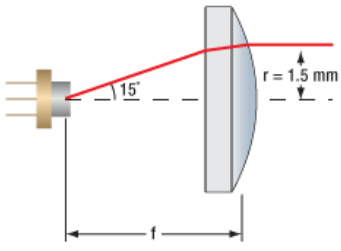
Example 1: Collimating a Diverging Beam

- Laser Diode to be Used: L780P010
- Desired Collimated Beam Diameter: Ø3 mm (Major Axis)

When choosing a collimation lens, it is essential to know the divergence angle of the source being used and the desired output diameter. The specifications for the L780P010 laser diode indicate that the typical parallel and perpendicular FWHM beam divergences are 8° and 30°, respectively. Therefore, as the light diverges, an elliptical beam will result. To collect as much light as possible during the collimation process, consider the larger of these two divergence angles in any calculations (i.e., in this case, use 30°). If you wish to convert your elliptical beam into a round one, we suggest using an anamorphic prism pair, which magnifies one axis of your beam; for details, see Example 2 below.

Assuming that the thickness of the lens is small compared to the radius of curvature, the thin lens approximation can be used to determine the appropriate focal length for the asphere. Assuming a divergence angle of 30° (FWHM) and desired beam diameter of 3 mm:





$$f = \frac{1.5\text{ mm}}{\tan 15^\circ} = 5.6\text{ mm}$$

Θ = Divergence Angle Ø = Beam Diameter f = Focal Length r = Collimated Beam Radius = Ø/2

Note that the focal length is generally not equal to the needed distance between the light source and the lens.

With this information known, it is now time to choose the appropriate collimating lens. Thorlabs offers a large selection of aspheric lenses. For this application,

the ideal lens is a molded glass aspheric lens with focal length near 5.6 mm and our -B antireflection coating, which covers 780 nm. The C171TMD-B (mounted) or 354171-B (unmounted) aspheric lenses have a focal length of 6.20 mm, which will result in a collimated beam diameter (major axis) of 3.3 mm. Next, check to see if the numerical aperture (NA) of the diode is smaller than the NA of the lens:

$$0.30 = NA_{Lens} > NA_{Diode} \approx \sin(15°) = 0.26$$

Up to this point, we have been using the full-width at half maximum (FWHM) beam diameter to characterize the beam. However, a better practice is to use the $1/e^2$ beam diameter. For a Gaussian beam profile, the $1/e^2$ diameter is almost equal to 1.7X the FWHM diameter. The $1/e^2$ beam diameter therefore captures more of the laser diode's output light (for greater power delivery) and minimizes far-field diffraction (by clipping less of the incident light).

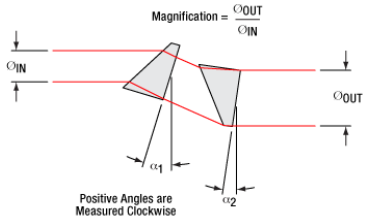
A good rule of thumb is to pick a lens with an NA twice that of the laser diode NA. For example, either the A390-B or the A390TM-B could be used as these lenses each have an NA of 0.53, which is more than twice the approximate NA of our laser diode (0.26). These lenses each have a focal length of 4.6 mm, resulting in an approximate major beam diameter of 2.5 mm. In general, using a collimating lens with a short focal length will result in a small collimated beam diameter and a large beam divergence, while a lens with a large focal length will result in a large collimated beam diameter and a small divergence.

Example 2: Circularizing an Elliptical Beam

Using the laser diode and aspheric lens chosen above, we can use an anamorphic prism pair to convert our collimated, elliptical beam into a circular beam.

Whereas earlier we considered only the larger divergence angle, we now look at the smaller beam divergence of 8°. From this, and using the effective focal length of the A390-B aspheric lens chosen in Example 1, we can determine the length of the semi-minor axis of the elliptical beam after collimation:

$$r' = f * \tan(\Theta'/2) = 4.6 \text{ mm} * \tan(4°) = 0.32 \text{ mm}$$



The minor beam diameter is double the semi-minor axis, or 0.64 mm. In order to magnify the minor diameter to be equal to the major diameter of 2.5 mm, we will need an anamorphic prism pair that yields a magnification of 3.9. Thorlabs offers both mounted and unmounted prism pairs. Mounted prism pairs provide the benefit of a stable housing to preserve alignment, while unmounted prism pairs can be positioned at any angle to achieve the exact desired magnification.

The PS883-B mounted prism pair provides a magnification of 4.0 for a 950 nm wavelength beam. Because shorter wavelengths undergo greater magnification when passing through the prism pair, we can expect our 780 nm beam to be magnified by slightly more than 4.0X. Thus, the beam will still maintain a small degree of ellipticity.

Alternatively, we can use the PS871-B unmounted prism pair to achieve the precise magnification of the minor diameter necessary to produce a circular beam. Using the data available here, we see that the PS871-B achieves a magnification of 4.0 when the prisms are positioned at the following angles for a 670 nm wavelength beam:

α_1: +34.608° α_2: -1.2455°

Refer to the diagram to the right for α_1 and α_2 definitions. Our 780 nm laser will experience slightly less magnification than a 670 nm beam passing through the prisms at these angles. Some trial and error may be required to achieve the exact desired magnification. In general:

- To increase magnification, rotate the first prism clockwise (increasing α_1) and rotate the second prism counterclockwise (decreasing α_2).
- To reduce magnification, rotate the first prism counterclockwise (decreasing α_1) and rotate the second prism clockwise (increasing α_2).

Remember that the prism pair introduces a linear offset between the input and output beams which increases with greater magnification.

Hide Selection Guide

SELECTION GUIDE

The table below contains all molded visible and near-IR aspheric lenses offered by Thorlabs. For our selection of IR molded aspheres, click here. The Item # listed is that of the unmounted, uncoated lens. An "X" in any of the five AR Coating Columns indicates the lens is available with that coating (note that the V coating availability is indicated with the design wavelength). The table to the right defines each letter and lists the specified AR coating range.

AR Coating Abbreviations	
Abbreviation	**Description**
U	Uncoated: Optics Do Not have an AR Coating
A	Broadband AR Coating for the 350 - 700 nm or 400 - 600 nm Range
B	Broadband AR Coating for the 600 - 1050 nm or 650 - 1050 nm Range
C	Broadband AR Coating for the 1050 - 1620 nm or 1050 - 1700 nm Range
V	Narrowband AR Coating Designed for the Wavelength Listed in the Table Below

Clicking on the X takes you to the landing page
where that lens (mounted or unmounted) can be purchased.

Base Item #	AR Coating Options					Effective Focal Length	NA	Outer Diameter of Unmounted Lens	Working Distance		Entrance Clear Aperture of Unmounted Lens
	U	A	B	C	V				Unmounted	Mounted[a]	
354710	X	X	X	X		1.5 mm	0.5	2.650 mm	0.5 mm[b]	0.4 mm[b]	S1: 1.15 mm S2: 1.50 mm[c]
354140	X	X	X	X		1.5 mm	0.6	2.400 mm	0.8 mm	0.8 mm	S1: 1.14 mm S2: 1.60 mm[c]
355151	X	X	X	X		2.0 mm	0.5	3.000 mm	0.5 mm[b]	0.3 mm[b]	S1: 1.09 mm S2: 2.00 mm[c]
355440	X	X	X	X		2.8 mm	0.3/0.5[c]	4.700 mm	2.0 mm[b]	1.8 mm[b]	S1: 3.76 mm S2: 4.12 mm[c]
355392	X	X	X	X		2.8 mm	0.6	4.000 mm	1.5 mm	1.0 mm	S1: 2.50 mm S2: 3.60 mm[c]
355390	X	X	X	X		2.8 mm	0.55	4.500 mm	2.2 mm	1.9 mm	S1: 3.60 mm S2: 3.60 mm[c]
355660	X	X	X	X		3.0 mm	0.5	4.000 mm	1.6 mm	1.3 mm	S1: 2.35 mm S2: 3.60 mm[c]
354330	X	X	X	X		3.1 mm	0.7	6.325 mm	1.8 mm	1.77 mm	S1: 5.00 mm S2: 3.84 mm[c]
N414		X	X	X		3.30 mm	0.47	4.50 mm	1.94 mm	1.83 mm	3.52 mm
354340	X	X	X			4.0 mm	0.6	6.325 mm	1.5 mm[b]	1.2 mm[b]	S1: 3.77 mm S2: 5.10 mm[c]
352610			X			4.00 mm	0.60	6.325 mm	1.52 mm	1.22 mm	4.80 mm
357610	X	X				4.0 mm	0.6	6.325 mm	1.5 mm[b]	1.1 mm[b]	S1: 3.39 mm S2: 4.80 mm[c]
357775	X	X	X		405	4.0 mm	0.6	6.325 mm	1.9 mm[b]	1.5 mm[b]	S1: 3.45 mm S2: 4.80 mm[c]
354350	X		X	X		4.5 mm	0.4	4.700 mm	2.2 mm	1.6 mm	S1: 2.05 mm S2: 3.70 mm[c]
355230	X	X	X	X		4.5 mm	0.6	6.330 mm	2.8 mm[b]	2.4 mm[b]	S1: 3.93 mm S2: 5.07 mm[c]
A230	X	X	X	X		4.51 mm	0.55	6.34 mm	2.91 mm	2.53 mm	4.95 mm
352230					1064	4.51 mm	0.551	6.325 mm	2.67 mm	2.43 mm	4.95 mm
354453	X	X	X	X		4.6 mm	0.5	6.000 mm	2.0 mm[b]	0.9 mm[b]	S1: 3.38 mm S2: 4.80 mm[c]
A390		X	X			4.60 mm	0.53	6.00 mm	2.70 mm	1.64 mm	4.89 mm
354430	X		X	X		5.0 mm	0.2	2.000 mm	4.4 mm	4.0 mm	S1: 1.40 mm S2: 1.60 mm[c]
354105	X	X	X	X		5.5 mm	0.6	7.200 mm	3.1 mm[b]	2.0 mm[b]	S1: 4.96 mm S2: 6.00 mm[c]
354171	X	X	X	X		6.2 mm	0.3	4.700 mm	3.4 mm[b]	2.8 mm[b]	S1: 2.72 mm S2: 3.70 mm[c]
355110	X	X	X	X		6.2 mm	0.4	7.200 mm	2.7 mm[b]	1.6 mm[b]	S1: 2.93 mm S2: 5.00 mm[c]
352110					1064	6.24 mm	0.40	7.20 mm	2.67 mm	1.70 mm	5.00 mm
A110	X	X	X	X		6.24 mm	0.40	7.20 mm	3.39 mm	2.39 mm	5.00 mm
A375		X	X	X		7.50 mm	0.30	6.51 mm	5.90 mm	5.59 mm	4.50 mm
354240	X	X	X	X		8.00 mm	0.5	9.950 mm	5.90 mm[b]	4.80 mm[b]	S1: 8.00 mm S2: 6.94 mm[c]
A240	X	X	X	X		8.00 mm	0.50	9.94 mm	5.92 mm	4.79 mm	8.00 mm
											S1: 8.00 mm

352240					1064	8.0 mm	0.5	9.950 mm	4.9 mm	3.8 mm	S2: 6.94 mm[c]
354060	X	X	X	X		9.6 mm	0.3	6.325 mm	7.5 mm[b]	7.1 mm[b]	S1: 5.13 mm S2: 5.20 mm[c]
354061	X	X	X	X		11.0 mm	0.2	6.325 mm	8.9 mm[b]	8.5 mm[b]	S1: 4.63 mm S2: 5.20 mm[c]
352220					1064	11.00 mm	0.25	7.215 mm	6.97 mm	5.83 mm	5.50 mm
A220	X	X	X			11.00 mm	0.26	7.20 mm	7.97 mm	6.91 mm	5.50 mm
354220	X	X	X	X		11.0 mm	0.3	7.200 mm	6.9 mm[b]	5.8 mm	S1: 4.07 mm S2: 5.50 mm[c]
355397	X	X	X	X		11.0 mm	0.3	7.200 mm	9.3 mm[b]	8.2 mm[b]	S1: 6.24 mm S2: 6.68 mm[c]
A397		X	X	X		11.00 mm	0.30	7.20 mm	9.64 mm	8.44 mm	6.59 mm
354560	X	X	X	X		13.86 mm	0.2	6.330 mm	12.1 mm	11.7 mm	S1: 4.54 mm S2: 5.10 mm[c]
A260		X	X	X		15.29 mm	0.16	6.50 mm	14.09 mm	13.84 mm	5.00 mm
354260	X	X	X	X		15.3 mm	0.2	6.500 mm	12.7 mm[b]	12.4 mm[b]	S1: 4.61 mm S2: 5.00 mm[c]
352280					1064	18.40 mm	0.15	6.500 mm	15.88 mm	15.63 mm	5.50 mm
A280		X	X	X		18.40 mm	0.15	6.50 mm	17.13 mm	16.88 mm	5.50 mm
354280	X	X	X	X		18.4 mm	0.2	6.500 mm	15.9 mm[b]	15.6 mm[b]	S1: 5.15 mm S2: 5.50 mm[c]

a. The mounted working distance is measured from the edge of the unthreaded portion of the housing.
b. This working distance is measured from the back surface of the lens (unmounted) or the back of the housing (mounted) to the front of the window of the laser diode being collimated.
c. The clear aperture of the unmounted lens is different on either side. Please visit the landing page for more details.

Hide EFL = 1.xx mm

EFL = 1.xx mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
354140-B		1.45 mm	0.58	2.4 mm	0.81 mm	1.60 mm	1.0 mm	780 nm	600 - 1050 nm	∞	-	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C140TMD-B				6.2 mm	0.81 mm									M6 x 0.5	SPW306
354710-B		1.49 mm	0.53	2.7 mm	0.52mm[d]	1.50 mm	0.9 mm	1550 nm	600 - 1050 nm	∞	0.25 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C710TMD-B				6.2 mm	0.42 mm[d]									M6 x 0.5	SPW306

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.
d. This working distance is measured from the lens to the to the window of the laser diode being collimated (not the emission point).

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture

OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness

WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
354140-B	**f = 1.45 mm, NA = 0.58, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$61.56** **Volume Pricing Available**	**Today**
C140TMD-B	**f = 1.45 mm, NA = 0.58, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$95.31** **Volume Pricing Available**	**Today**
		$76.87	

354710-B	**f = 1.49 mm, NA = 0.53, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**Volume Pricing Available**	**Today**
C710TMD-B	**f = 1.49 mm, NA = 0.53, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$101.86 Volume Pricing Available**	**Today**

Hide EFL = 2.xx mm

EFL = 2.xx mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
355151-B		2.00 mm	0.50	3.0 mm	0.48 mm[d]	2.00 mm	1.9 mm	780 nm	600 - 1050 nm	∞	0.25 mm	D-ZLaF52LA	Focal Shift / Spot Size Cross Section	-	-
C151TMD-B				6.2 mm	0.28 mm[d]									M6 x 0.5	SPW306
355390-B		2.75 mm	0.55	4.50 mm	2.16 mm	3.60 mm	1.90 mm	830 nm	600 - 1050 nm	∞	-	D-ZLaF52LA	390_Asph.pdf	-	-
C390TME-B				8.21 mm	1.91 mm									M8 x 0.5	SPW308
355392-B		2.75 mm	0.64	4.0 mm	1.50 mm	3.60 mm	2.2 mm	830 nm	650 - 1050 nm	∞	-	D-ZLaF52LA	392_Asph.pdf	-	-
C392TME-B				6.2 mm	0.98 mm									M6 x 0.5	SPW306
355440-B		2.76 mm	0.26[e] 0.52[f]	4.7 mm	1.96 mm[d,e] 7.09 mm[d,f]	4.12 mm	3.8 mm	980 nm	600 - 1050 nm	2	0.25 mm	D-ZLaF52LA	Focal Shift / Spot Size Cross Section	-	-
C440TMD-B				8.2 mm	1.86 mm[d,e] 7.09 mm[d,f]	3.76 mm[e] 4.12 mm[f]								M8 x 0.5	SPW308
355660-B		2.97 mm	0.60	4.00 mm	1.56 mm	3.60 mm	2.50 mm	1550 nm	600 - 1050 nm	∞	-	D-ZLaF52LA	660_Asph.pdf	-	-
C660TME-B				8.20 mm	1.31 mm									M8 x 0.5	SPW308

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.
d. This working distance is measured from the lens to the to the window of the laser diode being collimated (not the emission point).
e. Image side.
f. Object side.

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture

OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness

WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
355151-B	**f = 2.00 mm, NA = 0.50, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$69.98 Volume Pricing Available**	**Today**
C151TMD-B	**f = 2.00 mm, NA = 0.50, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$104.06 Volume Pricing Available**	**Today**
355390-B	**f = 2.75 mm, NA = 0.55, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$90.94 Volume Pricing Available**	**Today**
C390TME-B	**f = 2.75 mm, NA = 0.55, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$97.19 Volume Pricing Available**	**Today**
355392-B	**Customer Inspired! f = 2.75 mm, NA = 0.64, Unmounted Aspheric Lens, ARC: 650 - 1050 nm**	**$90.94 Volume Pricing Available**	**Today**
C392TME-B	**Customer Inspired! f = 2.75 mm, NA = 0.64, Mounted Aspheric Lens, ARC: 650 - 1050 nm**	**$97.19 Volume Pricing Available**	**Today**
355440-B	**f = 2.76 mm, NA = 0.26/0.52, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$65.93 Volume Pricing Available**	**Today**
C440TMD-B	**f = 2.76 mm, NA = 0.26/0.52, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$87.81 Volume Pricing Available**	**Today**
355660-B	**f = 2.97 mm, NA = 0.60, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$107.81 Volume Pricing Available**	**Today**
C660TME-B	**f = 2.97 mm, NA = 0.60, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$114.37 Volume Pricing Available**	**Today**

Hide EFL = 3.xx mm

EFL = 3.xx mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
354330-B		3.1 mm	0.7	6.33 mm	1.8 mm	S1: 5.00 mm S2: 3.84 mm	3.214 mm	830 nm	600 - 1050 nm	∞	-	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C330TMD-B				9.24 mm	1.8 mm									M9 x 0.5	SPW301
N414-B		3.30 mm	0.47	4.50 mm	1.94 mm	3.52 mm	3.87 mm	670 nm	650 - 1050 nm	∞	0.25 mm	H-ZLaF52	N414_Asph.pdf	-	-
N414TM-B				6.22 mm	1.83 mm									M6 x 0.5	SPW306

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture
OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness
WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
354330-B	**f = 3.1 mm, NA = 0.7, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$76.87 Volume Pricing Available**	**Today**
C330TMD-B	**f = 3.1 mm, NA = 0.7, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$95.31 Volume Pricing Available**	**Today**
N414-B	**f = 3.30 mm, NA = 0.47, Unmounted Aspheric Lens, ARC: 650 - 1050 nm**	**$99.87 Volume Pricing Available**	**Today**
N414TM-B	**f = 3.30 mm, NA = 0.47, Mounted Aspheric Lens, ARC: 650 - 1050 nm**	**$105.98 Volume Pricing Available**	**Today**

Hide EFL = 4.xx mm

EFL = 4.xx mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
352610-B		4.00 mm	0.60	6.325 mm	1.52 mm[d]	4.80 mm	3.057 mm	410 nm	600 - 1050 nm	∞	1.20 mm	ECO-550	610_Asph.pdf	-	-
C610TME-B				9.2 mm	1.22 mm[d]									M9 x 0.5	SPW301
357775-B		4.0 mm	0.6	6.325 mm	1.9 mm[e]	S1: 3.45 mm S2: 4.80 mm	2.898 mm	408 nm	600 - 1050 nm	∞	0.250 mm	D-LAK6	Focal Shift / Spot Size Cross Section	-	-
C775TMD-B				9.2 mm	1.5 mm[e]									M9 x 0.5	SPW301
354340-B		4.03 mm	0.64	6.3 mm	1.48 mm[d]	5.10 mm	3.1 mm	685 nm	600 - 1050 nm	∞	1.20 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C340TMD-B				9.2 mm	1.18 mm									M9 x 0.5	SPW301
354350-B		4.50 mm	0.43	4.7 mm	2.19 mm	3.70 mm	3.6 mm	980 nm	600 - 1050 nm	∞	-	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C350TMD-B				8.2 mm	1.59 mm									M8 x 0.5	SPW308
355230-B		4.51 mm	0.55	6.3 mm	2.83 mm[d]	5.07 mm	2.7 mm	780 nm	600 - 1050 nm	∞	0.25 mm	D-ZLaF52LA	Focal Shift / Spot Size Cross Section	-	-
C230TMD-B				9.2 mm	2.43 mm									M9 x 0.5	SPW301
A230-B		4.51 mm	0.55	6.34 mm	2.91 mm	4.95 mm	2.94 mm	780 nm	650 - 1050 nm	∞	0.25 mm	S-NPH1	A230_Asph.pdf	-	-
A230TM-B				9.24 mm	2.53 mm									M9 x 0.5	SPW301
354453-B		4.6 mm	0.5	6.000 mm	2.049 mm[d]	S1: 3.38 mm S2: 4.80 mm	3.135 mm	655 nm	600 - 1050 nm	∞	0.275 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C453TMD-B				9.2 mm										M9 x 0.5	SPW301
A390-B		4.60 mm	0.53	6.00 mm	2.70 mm	4.89 mm	3.10 mm	655 nm	650 - 1050 nm	∞	0.275 mm	H-LaK54	A390_Asph.pdf	-	-
A390TM-B				9.24 mm	1.64 mm									M9 x 0.5	SPW301

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.

EFL = Effective Focal Length
WD = Working Distance

c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.
d. This working distance is measured from the lens to the to the window of the laser diode being collimated (not the emission point).
e. This working distance is measured from the back surface of the lens (unmounted) or the back of the housing (mounted) to the front of the window of the laser diode being collimated.

NA = Numerical Aperture
CA = Clear Aperture
OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
352610-B	f = 4.00 mm, NA = 0.6, Unmounted Aspheric Lens, ARC: 600 - 1050 nm	$107.81	Today
C610TME-B	f = 4.00 mm, NA = 0.6, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$114.37	Today
357775-B	NEW! f = 4.0 mm, NA = 0.6, Unmounted Aspheric Lens, ARC: 600 - 1050 nm	$124.71	Today
C775TMD-B	NEW! f = 4.0 mm, NA = 0.6, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$142.20	Today
354340-B	f = 4.03 mm, NA = 0.64, Unmounted Aspheric Lens, ARC: 600 - 1050 nm	$76.87 Volume Pricing Available	Today
C340TMD-B	f = 4.03 mm, NA = 0.64, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$95.31 Volume Pricing Available	Today
354350-B	f = 4.50 mm, NA = 0.43, Unmounted Aspheric Lens, ARC: 600 - 1050 nm	$66.57 Volume Pricing Available	Today
C350TMD-B	f = 4.50 mm, NA = 0.43, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$88.75 Volume Pricing Available	Today
355230-B	f = 4.51 mm, NA = 0.55, Unmounted Aspheric Lens, ARC: 600 - 1050 nm	$65.93 Volume Pricing Available	Today
C230TMD-B	f = 4.51 mm, NA = 0.55, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$84.38 Volume Pricing Available	Today
A230-B	f = 4.51 mm, NA = 0.55, Unmounted Aspheric Lens, ARC: 650 - 1050 nm	$90.55 Volume Pricing Available	Today
A230TM-B	f = 4.51 mm, NA = 0.55, Mounted Aspheric Lens, ARC: 650 - 1050 nm	$96.96 Volume Pricing Available	Today
354453-B	f = 4.6 mm, NA = 0.5, Unmounted Aspehric Lens, ARC: 600 - 1050 nm	$70.46 Volume Pricing Available	Today
C453TMD-B	f = 4.6 mm, NA = 0.5, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$87.29 Volume Pricing Available	Today
A390-B	f = 4.60 mm, NA = 0.53, Unmounted Aspheric Lens, ARC: 650 - 1050 nm	$99.87 Volume Pricing Available	Today
A390TM-B	f = 4.60 mm, NA = 0.53, Mounted Aspheric Lens, ARC: 650 - 1050 nm	$105.98 Volume Pricing Available	Today

Hide EFL = 5.xx mm

EFL = 5.xx mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
354430-B		5.00 mm	0.16	2.00 mm	4.37 mm	S1: 1.6 mm S2: 1.4 mm	0.99 mm	1550 nm	600 - 1050 nm	∞	-	D-ZK3	430_Asph.pdf	-	-
C430TME-B				6.24 mm	3.37 mm									M6 x 0.5	SPW306
354105-B		5.5 mm	0.6	7.200 mm	3.091 mm[d]	S1: 4.96 mm S2: 6.00 mm	2.937 mm	633 nm	600 - 1050 nm	∞	0.250 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C105TMD-B				9.2 mm										M9 x 0.5	SPW301

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture
WD = Working Distance
DW = Design Wavelength
T = Center Thickness

these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.
d. This working distance is measured from the lens to the to the window of the laser diode being collimated (not the emission point).

c

OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness

Part Number	Description	Price	Availability
354430-B	f = 5.00 mm, NA = 0.16, Unmounted Aspheric Lens, ARC: 600 - 1050 nm	$90.94 Volume Pricing Available	Today
C430TME-B	f = 5.00 mm, NA = 0.16, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$97.19 Volume Pricing Available	Today
354105-B	f = 5.5 mm, NA = 0.6, Unmounted Aspheric Lens, ARC: 600 - 1050 nm	$137.18 Volume Pricing Available	Today
C105TMD-B	f = 5.5 mm, NA = 0.6, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$153.54 Volume Pricing Available	Today

Hide EFL = 6.xx mm

EFL = 6.xx mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
354171-B		6.20 mm	0.30	4.7 mm	3.44 mm[d]	3.70 mm	3.5 mm	633 nm	600 - 1050 nm	∞	0.28 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C171TMD-B				8.2 mm	2.84 mm[d]									M8 x 0.5	SPW308
355110-B		6.24 mm	0.40	7.2 mm	2.69 mm[d]	5.00 mm	5.2 mm	780 nm	600 - 1050 nm	∞	0.28 mm	D-ZLaF52LA	Focal Shift / Spot Size Cross Section	-	-
C110TMD-B				9.2 mm	1.59 mm[d]									M9 x 0.5	SPW301
A110-B		6.24 mm	0.40	7.20 mm	3.39 mm	5.00 mm	5.36 mm	780 nm	650 - 1050 nm	∞	0.275 mm	H-LaK54	A110_Asph.pdf	-	-
A110TM-B				9.24 mm	2.39 mm									M9 x 0.5	SPW301

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.
d. This working distance is measured from the lens to the to the window of the laser diode being collimated (not the emission point).

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture

OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness

WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
354171-B	f = 6.20 mm, NA = 0.30, Unmounted Aspheric Lens, ARC: 600 - 1050 nm	$66.57 Volume Pricing Available	Today
C171TMD-B	f = 6.20 mm, NA = 0.30, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$88.75 Volume Pricing Available	Today
355110-B	f = 6.24 mm, NA = 0.40, Unmounted Aspheric Lens, ARC: 600 - 1050 nm	$87.81 Volume Pricing Available	Today
C110TMD-B	f = 6.24 mm, NA = 0.40, Mounted Aspheric Lens, ARC: 600 - 1050 nm	$106.24 Volume Pricing Available	Today
A110-B	f = 6.24 mm, NA = 0.40, Unmounted Aspheric Lens, ARC: 650 - 1050 nm	$90.55 Volume Pricing Available	Today
A110TM-B	f = 6.24 mm, NA = 0.40, Mounted Aspheric Lens, ARC: 650 - 1050 nm	$96.96 Volume Pricing Available	Today

Hide EFL = 7.50 mm

EFL = 7.50 mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench

A375-B		7.50 mm	0.30	6.51 mm	5.90 mm	4.50 mm	2.75 mm	810 nm	650 - 1050 nm	∞	0.275 mm	H-LaK54	A375_Asph.pdf	-	-
A375TM-B				9.24 mm	5.59 mm									M9 x 0.5	SPW301

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the deisgn wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence a laser window (not included) of the indicated thickness.

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture

OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness

WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
A375-B	**f = 7.5 mm, NA = 0.3, Unmounted Aspheric Lens, ARC: 650 - 1050 nm**	**$99.87 Volume Pricing Available**	**Today**
A375TM-B	**f = 7.5 mm, NA = 0.3, Mounted Aspheric Lens, ARC: 650 - 1050 nm**	**$105.98 Volume Pricing Available**	**Today**

Hide EFL = 8.00 mm

EFL = 8.00 mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
354240-B		8.00 mm	0.50	9.94 mm	5.9 mm	S1: 8.00 mm S2: 6.94 mm	3.434 mm	780 nm	600 - 1050 nm	∞	0.25 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C240TMD-B				12.24 mm	4.8 mm									M12 x 0.5	SPW302
A240-B		8.00 mm	0.50	9.94 mm	5.92 mm	8.00 mm	3.69 mm	780 nm	650 - 1050 nm	∞	0.25 mm	D-LaK6	A240_Asph.pdf	-	-
A240TM-B				12.24 mm	4.79 mm									M12 x 0.5	SPW302

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture

OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness

WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
354240-B	**f = 8.00 mm, NA = 0.5, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$73.52 Volume Pricing Available**	**Today**
C240TMD-B	**f = 8.00 mm, NA = 0.5, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$95.58 Volume Pricing Available**	**Today**
A240-B	**f = 8.0 mm, NA = 0.5, Unmounted Aspheric Lens, ARC: 650 - 1050 nm**	**$90.55 Volume Pricing Available**	**Today**
A240TM-B	**f = 8.0 mm, NA = 0.5, Mounted Aspheric Lens, ARC: 650 - 1050 nm**	**$96.96 Volume Pricing Available**	**Today**

Hide EFL = 9.6 mm

EFL = 9.6 mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
354060-B		9.6	0.3	6.325 mm	7.486	S1: 5.13 mm	2.493	633	600 - 1050	∞	0.250	D-	Focal Shift / Spot Size Cross	-	-

C060TMD-B		mm		9.2 mm	mm[d]	S2: 5.20 mm	mm	nm	nm		mm	ZK3	Section	M9 x 0.5	SPW301

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the deisgn wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.
d. This working distance is measured from the lens to the to the window of the laser diode being collimated (not the emission point).

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture
OD = Outer Diameter
M = Magnification
LWT = Laser Window THickness
WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
354060-B	**f = 9.6 mm, NA = 0.3, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$70.46 Volume Pricing Available**	**Today**
C060TMD-B	**f = 9.6 mm, NA = 0.3, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$86.82 Volume Pricing Available**	**Today**

Hide EFL = 11.00 mm

EFL = 11.00 mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
354061-B		11.0 mm	0.2	6.330 mm	8.909 mm[d]	S1: 4.63 mm S2: 5.20 mm	2.434 mm	633 nm	600 - 1050 nm	∞	0.250 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C061TMD-B				9.2 mm										M9 x 0.5	SPW301
354220-B		11.00 mm	0.25	7.2 mm	6.91 mm[d]	5.50 mm	5.0 mm	633 nm	600 - 1050 nm	∞	0.25 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C220TMD-B				9.2 mm	5.81 mm									M9 x 0.5	SPW301
A220-B		11.00 mm	0.26	7.20 mm	7.97 mm	5.50 mm	5.00 mm	633 nm	650 - 1050 nm	∞	0.25 mm	D-K59	A220_Asph.pdf	-	-
A220TM-B				9.24 mm	6.91 mm						0.275 mm			M9 x 0.5	SPW301
355397-B		11.0 mm	0.3	7.200 mm	9.346 mm[d]	S1: 6.24 mm S2: 6.68 mm	1.947 mm	670 nm	600 - 1050 nm	∞	0.275 mm	D-ZLaF52LA	Focal Shift / Spot Size Cross Section	-	-
C397TMD-B				9.2 mm										M9 x 0.5	SPW301
A397-B		11.00 mm	0.30	7.20 mm	9.64 mm	6.59 mm	2.20 mm	670 nm	650 - 1050 nm	∞	0.275 mm	H-LaK54	A397_Asph.pdf	-	-
A397TM-B				9.24 mm	8.44 mm									M9 x 0.5	SPW301

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.
d. This working distance is measured from the lens to the to the window of the laser diode being collimated (not the emission point).

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture
OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness
WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
354061-B	**f = 11.0 mm, NA = 0.2, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$70.46 Volume Pricing Available**	**Today**
C061TMD-B	**f = 11.0 mm, NA = 0.2, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$86.82 Volume Pricing Available**	**Today**
354220-B	**f = 11.00 mm, NA = 0.25, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$69.98 Volume Pricing Available**	**Today**
C220TMD-B	**f = 11.00 mm, NA = 0.25, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$88.75 Volume Pricing Available**	**Today**
A220-B	**f = 11.00 mm, NA = 0.26, Unmounted Aspheric Lens, ARC: 650 - 1050 nm**	**$90.55 Volume Pricing Available**	**Today**
A220TM-B	**f = 11.00 mm, NA = 0.26, Mounted Aspheric Lens, ARC: 650 - 1050 nm**	**$96.96 Volume Pricing Available**	**Today**

355397-B	**f = 11.0 mm, NA = 0.3, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$70.46 Volume Pricing Available**	**Lead Time**
C397TMD-B	**f = 11.0 mm, NA = 0.3, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$86.82 Volume Pricing Available**	**7-10 Days**
A397-B	**f = 11.00 mm, NA = 0.3, Unmounted Aspheric Lens, ARC: 650 - 1050 nm**	**$99.87 Volume Pricing Available**	**Today**
A397TM-B	**f = 11.00 mm, NA = 0.3, Mounted Aspheric Lens, ARC: 650 - 1050 nm**	**$105.98 Volume Pricing Available**	**Today**

Hide EFL = 13.86 mm

EFL = 13.86 mm

Item # (Unmounted / Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	Glass	Performance	Thread	Suggested Spanner Wrench
354560-B		13.86 mm	0.18	6.33 mm	12.11 mm	5.10 mm	2.8 mm	650 nm	600 - 1050 nm	∞	D-ZK3	560_Asph.pdf	-	-
C560TME-B				9.24 mm	11.74 mm								M9 x 0.5	SPW301

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture
WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

OD = Outer Diameter
M = Magnification

Part Number	Description	Price	Availability
354560-B	**f = 13.86 mm, NA = 0.18, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$97.19 Volume Pricing Available**	**Today**
C560TME-B	**f = 13.86 mm, NA = 0.18, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$104.06 Volume Pricing Available**	**Today**

Hide EFL = 15.29 mm

EFL = 15.29 mm

Item # (Unmounted/ Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
354260-B		15.29 mm	0.16	6.5 mm	12.73 mm[d]	5.00 mm	2.2 mm	780 nm	600 - 1050 nm	∞	0.25 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C260TMD-B				9.2 mm	12.43 mm[d]									M9 x 0.5	SPW301
A260-B		15.29 mm	0.16	6.50 mm	14.09 mm	5.00 mm	2.20 mm	780 nm	650 - 1050 nm	∞	0.25 mm	H-LaK54	A260_Asph.pdf	-	-
A260TM-B				9.24 mm	13.84 mm						-			M9 x 0.5	SPW301

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.
d. This working distance is measured from the lens to the window of the laser diode being collimated (not the emission point).

EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture
WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness

Part Number	Description	Price	Availability
354260-B	**f = 15.29 mm, NA = 0.16, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$76.87 Volume Pricing Available**	**Today**
C260TMD-B	**f = 15.29 mm, NA = 0.16, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$98.74 Volume Pricing Available**	**Today**
A260-B	**f = 15.29 mm, NA = 0.16, Unmounted Aspheric Lens, ARC: 650 - 1050 nm**	**$90.55 Volume Pricing Available**	**Today**
A260TM-B	**f = 15.29 mm, NA = 0.16, Mounted Aspheric Lens, ARC: 650 - 1050 nm**	**$96.96 Volume Pricing Available**	**Today**

Hide EFL = 18.40 mm

EFL = 18.40 mm

Item # (Unmounted/ Mounted)	Info	EFL[a]	NA	OD	WD[b]	CA	T_C	DW	AR Range	M	LWT[c]	Glass	Performance	Thread	Suggested Spanner Wrench
354280-B		18.40 mm	0.15	6.5 mm	15.86 mm[d]	5.50 mm	2.2 mm	780 nm	600 - 1050 nm	∞	0.25 mm	D-ZK3	Focal Shift / Spot Size Cross Section	-	-
C280TMD-B				9.2 mm	15.56 mm[d]									M9 x 0.5	SPW301
A280-B		18.40 mm	0.15	6.50 mm	17.13 mm	5.50 mm	2.17 mm	780 nm	650 - 1050 nm	∞	0.25 mm	H-LaK54	A280_Asph.pdf	-	-
A280TM-B				9.24 mm	16.88 mm						-			M9 x 0.5	SPW301

a. EFL is specified at the design wavelength for the unmounted lens.
b. WD is specified at the design wavelength.
c. Lenses with an LWT specification are designed for laser diode collimation; in these cases, the NA, WD, and wavefront are defined based on the presence of a laser window (not included) of the indicated thickness.
d. This working distance is measured from the lens to the window of the laser diode being collimated (not the emission point).

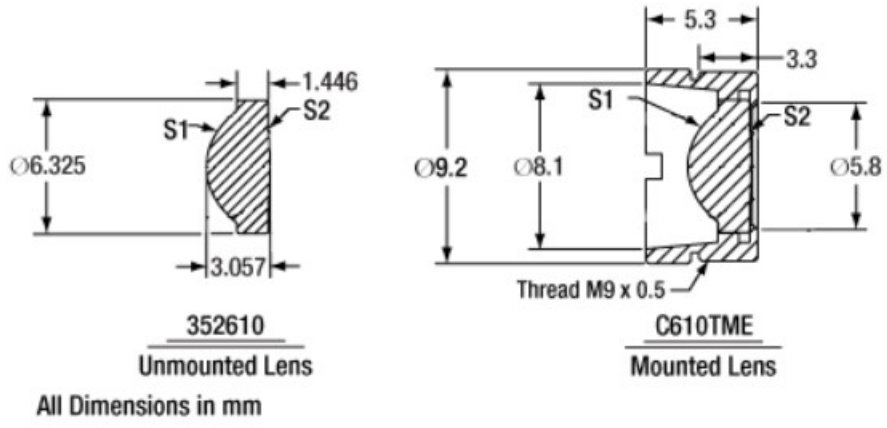
EFL = Effective Focal Length
NA = Numerical Aperture
CA = Clear Aperture

OD = Outer Diameter
M = Magnification
LWT = Laser Window Thickness

WD = Working Distance
DW = Design Wavelength
T_C = Center Thickness

Part Number	Description	Price	Availability
354280-B	**f = 18.40 mm, NA = 0.15, Unmounted Aspheric Lens, ARC: 600 - 1050 nm**	**$76.87** **Volume Pricing Available**	**Today**
C280TMD-B	**f = 18.40 mm, NA = 0.15, Mounted Aspheric Lens, ARC: 600 - 1050 nm**	**$98.74** **Volume Pricing Available**	**Today**
A280-B	**f = 18.4 mm, NA = 0.15, Unmounted Aspheric Lens, ARC: 650 - 1050 nm**	**$90.55** **Volume Pricing Available**	**Today**
A280TM-B	**f = 18.4 mm, NA = 0.15, Mounted Aspheric Lens, ARC: 650 - 1050 nm**	**$96.96** **Volume Pricing Available**	**Today**

Specifications | Glass | AR Coating | Aspheric Coefficients



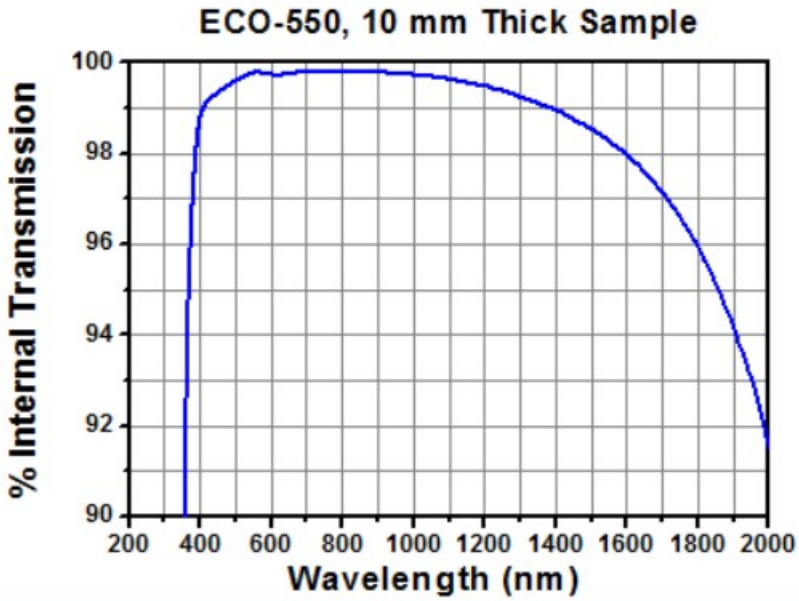
All Dimensions in mm

Lens Specifications			
Design Wavelength	410 nm	**Magnification**	Infinite
Numerical Aperture	0.60	**Window Thickness[a]**	1.200 mm
Clear Aperture	4.80 mm	**Laser Window Material / Index[a]**	K3 / 1.514
Effective Focal Length	4.00 mm	**Glass**	ECO-550
Working Distance[a]	1.52 mm	**Surface Quality**	40-20 Scratch-Dig (Entire Bulk Material)

a. The working distance is specified at the design wavelength and is measured from the lens or housing to a laser diode window with these specifications.

352610-B and C610TME-B

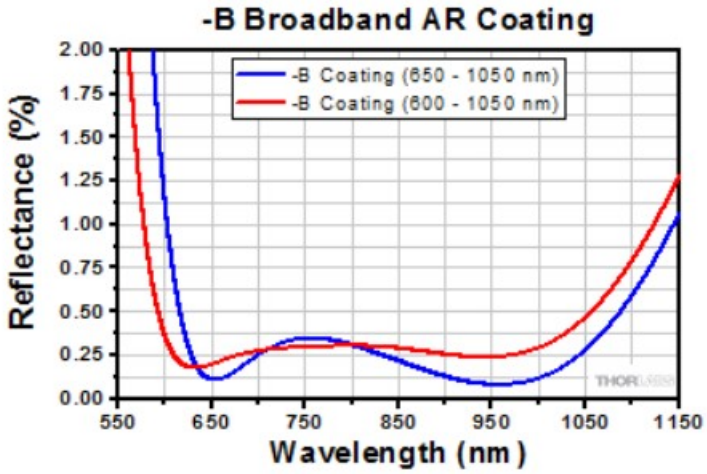
Specifications | Glass | AR Coating | Aspheric Coefficients



Glass Specifications	
V_d Number	50.28
CTE (10^{-6} / °C)	11.62
Thermo Optic Coefficient (10^{-6} / °C) ($\Delta n/\Delta T$)	-1.3 @ 1060 nm Measured Between 20 and 40 °C

352610-B and C610TME-B

Specifications | Glass | AR Coating | Aspheric Coefficients



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352610-B and C610TME-B

Specifications | Glass | AR Coating | Aspheric Coefficients

Surface	Side 1[a]	Side 2[a]
R (mm)	2.766089	-14.409165
k	-4.433989×10^{-1}	0
A_2	0	0
A_4	-4.880062×10^{-5}	3.989295×10^{-3}
A_6	-4.473264×10^{-5}	$-1.5900916 \times 10^{-4}$
A_8	-2.271819×10^{-6}	5.053819×10^{-6}

a. Side 1 and Side 2 are labeled as S1 and S2, respectively, on the drawings shown on the *Specifications* tab.

$$z = \frac{Y^2}{R\left(1+\sqrt{1-(1+k)Y^2/R^2}\right)} + A_2Y^2 + A_4Y^4 + A_6Y^6 + A_8Y^8 + A_{10}Y^{10} + A_{12}Y^{12} + A_{14}Y^{14} + A_{16}Y^{16}$$

Legend			
z	SAG as a Function of Y	k	Conic Constant
R	Radius of Curvature	A_n	n^{th} Order Aspheric Coefficient