LightPath® Technologies

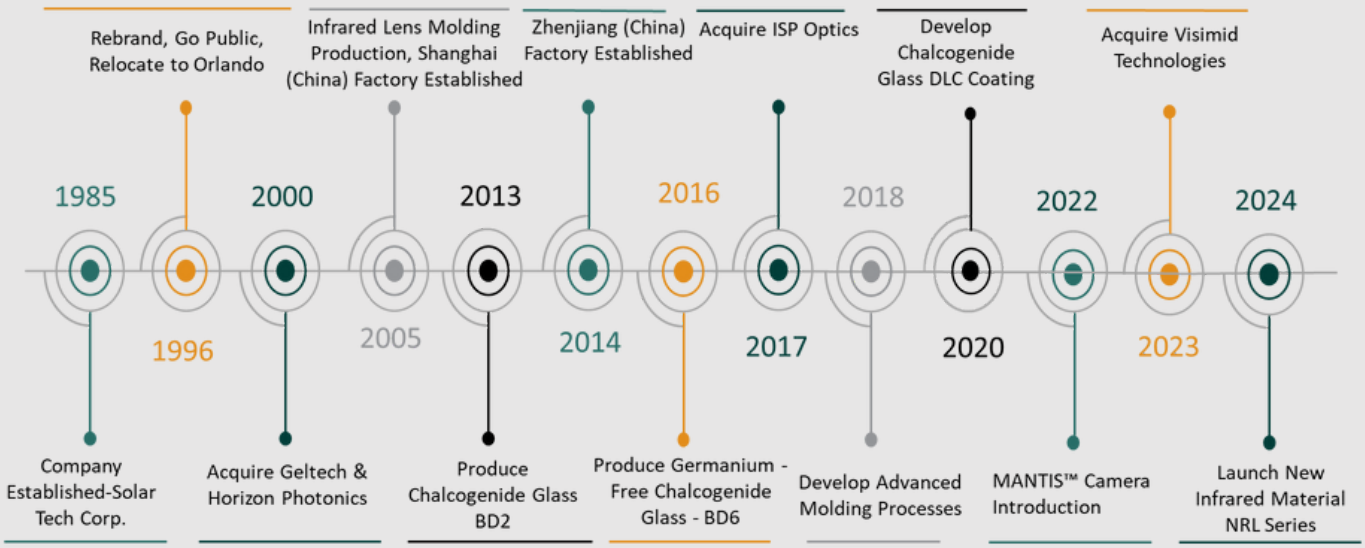
# Product Catalog
# Optical Components and Assemblies

# About LightPath Technologies

For more than four decades, LightPath Technologies(NASDAQ: LPTH)has been a leader in optics and photonics innovation, offering advanced solutions to the industrial, defense, telecommunications, medical, and test & measurement markets. Headquartered in Orlando, Florida, USA, the company also operates manufacturing and sales facilities in Latvia and China.

In China, LightPath's wholly-owned subsidiary, LightPath Optical Instruments (Zhenjiang) Co., Ltd., focuses on the design and manufacturing of proprietary optical and infrared components, including precision molded glass aspherical lenses and assemblies, infrared lenses and thermal imaging assemblies. In addition, the China factory provides customized optical components and comprehensive engineering design support for customers.

## Company History

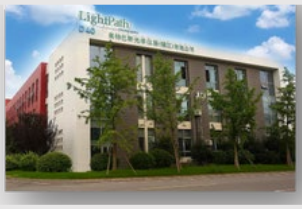



## Manufacturing Base

LightPath has 3 Manufacturing bases worldwide for optical components and assembly, located in Orlando, Florida, USA; Riga, Latvia; and Zhenjiang, Jiangsu, China.

**Company headquarters: Orlando, Florida, USA**

**Riga Factory, Latvia**



**Zhenjiang Factory, Jiangsu, China**

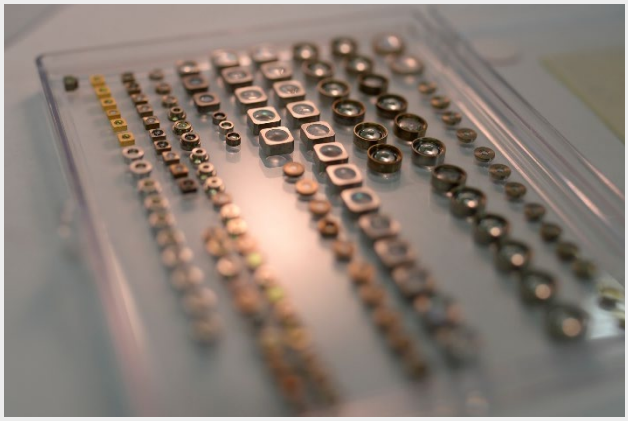
# Contents

## Custom Design and Manufacturing of Aspherical Lens

With its unique precision molding technology, LightPath is capable of customizing lenses according to customers' specific requirements. The company offers a wide variety of lens types, ranging from simple aspherical lenses to complex free-form surface lenses, including forms such as edged aspherical lenses, insert molded lenses, and lenses with holders.

LightPath's lens production capabilities include the following product types:

- Plano-convex aspherical lenses
- Biconvex aspherical lenses
- Meniscus aspherical lenses
- Insert molded lenses (lenses directly molded into metal holders)
- Metal holder cemented lenses
- Edged aspherical lenses



## Insert-Precision-Molding Aspherical Lens

LightPath's Insert-Precision-Molding aspherical lens technology is an innovation that integrates glass optical components with metal sleeve in a single molding process. This technology provides a highly reliable integrated solution for optical systems, especially in harsh environments. By molding the aspherical lens directly into the inner cavity of the metal sleeve, it achieves seamless integration of optical and mechanical structures, overcoming the physical limitations of traditional cementing processes.

### Numerical Aperture

LightPath's precision molded aspheric lenses have a numerical aperture(NA)range of 0.15 to 0.83. Lenses with low numerical apertures are suitable for applications such as barcode scanners, measuring instruments, and small-arms sights. In contrast, lenses with high numerical apertures are primarily used in data storage and industrial printing.

### Shape and Size

The diameter range of moldable aspherical lenses is from 1mm to 45mm. We also offer edged lenses to better adapt to the assembly and application scenarios of the lenses.

### Laser Spot Quality

For applications such as flow cytometers that have extremely high requirements for laser spot quality, LightPath can provide aspherical lenses with extremely high surface accuracy, such as the 352 series lenses. These lenses can effectively avoid spot problems that may occur during laser focusing, such as abnormal side lobes, abnormal spot shapes, and abnormal spot centers, thereby ensuring that the spot quality meets strict application requirements.

### Diffraction-Limited Performance

Most LightPath lenses are designed within the diffraction limit and measured on corresponding interferometers.

## Assemblies

With its extensive portfolio of optical components, LightPath is able to provide comprehensive and highly integrated optical assembly solutions. Our engineering team can design customized optical assemblies according to customers' precise specifications, covering a variety of application scenarios including, but not limited to:

- Fiber collimators
- Laser collimation modules
- Thermal imaging lenses for infrared cameras

## Lens Cutting and Edging

LightPath excels at cutting glass lenses to precise shapes and dimensions. Depending on the lens type, the processing tolerance can be controlled within ±5 µm, the edge chipping is less than 15 µm, and the cutting tolerance from the lens center to the edge is only a few micrometers. We have extensive experience in cutting lens arrays, wafers, and custom-shaped lenses.

To enhance cutting efficiency and large-scale production capacity, LightPath adopts a multi-blade cutting system, which effectively increases production output.

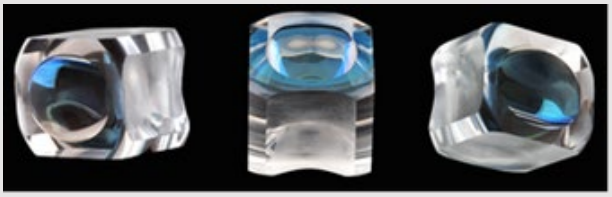
## Coating

LightPath offers standard AR coating for optical lenses and components, which can meet the needs of most common applications. In addition, we provide a wide range of customized coating services to meet specific optical performance requirements. Custom coating options include:

- Dual-band AR coating
- Triple-band AR coating
- V-type single-wavelength AR coating

## Free-Form Optics

Free-form optical components refer to optical designs that contain at least one free-form surface, which does not have translational or rotational symmetry with respect to the normal axis of an ordinary plane. LightPath's precision glass molding process is a cost-effective solution that enables the mass production of free-form optical components.



If you need a custom aspherical lens, please contact us!

## Aspherical Lens - High Performance Optical Components

- Combine high quality and high performance
- Can smoothly transition from sample manufacturing to large - scale production
- There are currently more than 120 types of standard aspherical lenses for customers to choose from
- Products comply with RoHS certification standards
- Aspherical lenses adopt diffraction - limited design and have excellent optical performance
- Can provide precision cutting services for lenses, facilitating subsequent assembly

LightPath, relying on its independently innovative glass precision molding technology, focuses on providing high performance aspheric lens solutions for the global high - end optical market. Our precision molded aspheric lenses adopt nanometer level surface shape control technology and demonstrate excellent performance in laser coupling and collimation applications. They are now widely used in the following fields: industrial lasers, medical instruments, light sources, laser radars, precision instruments, scientific research, etc.

**Aspherical Lenses - Standard Product List**

| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Clear Aperture | Design Wavelength |
|---|---|---|---|---|---|---|
| 355089 | 0.30 | 0.65 | 1.8 | 0.19 | 0.43/0.58 | 1310 |
| 355104 | 0.30 | 0.65 | 1.60 | 0.15/0.97 | 0.29/0.48 | 1300 |
| 355641 | 0.38 | 0.60 | 1.80 | 0.17 | 0.34/0.49 | 1310 |
| 355631 | 0.40 | 0.6/0.1 | 1.80 | 0.3/1.9 | 0.37/0.53 | 1310 |
| 355188 | 0.40 | 0.60 | 1.50 | 0.10 | 0.55/0.25 | 1300 |
| 355865 | 0.40 | 0.68 | 2.20 | 0.16 | 0.55/0.40 | 1577 |
| 355070 | 0.40 | 0.1/0.7 | 1.20 | 5.00/0.3 | 0.62/0.47 | 1550 |
| 355204 | 0.45 | 0.55/0.10 | 2.14 | 0.25/2.22 | 0.50/0.70 | 1310 |
| 355207 | 0.50 | 0.65 | 2.00 | 0.16 | 0.41/0.74 | 1550 |
| 355465 | 0.50 | 0.50/0.10 | 1.00 | 0.3/2.9 | 0.40/0.70 | 1310 |
| 355485 | 0.60 | 0.50/0.10 | 2.35 | 0.30/3.0 | 0.35/0.66 | 1550 |
| 355487 | 0.60 | 0.50/0.10 | 1.00 | 0.3/2.9 | 0.35/0.68 | 1550 |
| 355536 | 0.60 | 0.60 | 1.24 | 0.20 | 0.72/0.35 | 1310 |
| 355537 | 0.60 | 0.60 | 1.24 | 0.20 | 0.72/0.35 | 1310 |
| 355880 | 0.70 | 0.60 | 2.50 | 0.30 | 0.84/0.49 | 1550 |
| 355885 | 0.70 | 0.60 | 2.50 | 0.30 | 0.84/0.49 | 1550 |

**Aspherical Lenses - Standard Product List**

| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Clear Aperture | Design Wavelength |
|---|---|---|---|---|---|---|
| 355840 | 0.80 | 0.50 | 3.00 | 0.40 | 0.71/0.46 | 940 |
| 355915 | 0.80 | 0.10/0.50 | 1.30 | 3.90/0.7 | 1.00/0.77 | 1550 |
| 355236 | 0.86 | 0.35 | 1.87 | 0.53 | 0.64/0.43 | 1550 |
| 355960 | 1.00 | 0.60 | 3.92 | 0.20 | 1.2/0.39 | 1550 |
| 355198 | 1.05 | 0.50 | 1.40 | 0.61 | 1.10/0.84 | 1550 |
| 355200 | 1.10 | 0.4/0.1 | 2.40 | 1.1/4.8 | 1.24/1.24 | 1300 |
| 354450 | 1.20 | 0.30/0.30 | 1.80 | 1.7/1.7 | 1.14/1.14 | 980 |
| 357786 | 1.40 | 0.50 | 2.00 | 1.20 | 1.42/1.28 | 488 |
| 355182 | 1.48 | 0.21 | 4.02 | 1.18 | 0.70/0.70 | 1520-1570 |
| 352140 | 1.50 | 0.60 | 2.40 | 0.90 | 1.60/1.20 | 780 |
| 354710 | 1.50 | 0.50 | 2.65 | 1.00 | 1.5/1.15 | 1550 |
| 352710 | 1.50 | 0.50 | 2.65 | 1.10 | 1.50/1.40 | 1550 |
| 354140 | 1.50 | 0.60 | 2.40 | 0.80 | 1.6/1.14 | 780 |
| 355086 | 1.67 | 0.25 | 3.80 | 1.00 | 0.85/0.55 | 1550 |
| 355949 | 1.80 | 0.40 | 2.49 | 1.10 | 1.35/0.87 | 1550 |
| 355950 | 1.80 | 0.40 | 3.00 | 1.10 | 1.35/0.87 | 1550 |

## Aspherical Lenses - Standard Product List

| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Clear Aperture | Design Wavelength |
|---|---|---|---|---|---|---|
| 355951 | 1.80 | 0.40 | 1.79 | 1.10 | 1.35/0.87 | 1550 |
| 355755 | 1.90 | 0.2/0.2 | 1.70 | 3.6/3.6 | 1.10/1.10 | 1577 |
| 355860 | 1.97 | 0.30 | 1.79 | 1.35 | 1.25/1.05 | 1310 |
| 355087 | 1.98 | 0.21 | 3.80 | 1.65 | 0.85/0.74 | 1550 |
| 355150 | 2.00 | 0.50 | 3.00 | 1.40 | 2.20/2.20 | 780 |
| 355151 | 2.00 | 0.50 | 3.00 | 1.00 | 2.00/1.09 | 780 |
| 355215 | 2.00 | 0.20 | 1.78 | 1.59 | 0.8/0.7 | 1585 |
| 352150 | 2.00 | 0.50 | 3.00 | 1.10 | 2.00/1.50 | 780 |
| 355290 | 2.15 | 0.33 | 4.18 | 1.36 | 1.4/0.94 | 1310 |
| 357300 | 2.50 | 0.70 | 4.00 | 1.60 | 3.3/2.48 | 405 |
| 355945 | 2.50 | 0.30 | 3.00 | 1.80 | 1.6/1.18 | 1550 |
| 355410 | 2.50 | 0.20 | 1.79 | 1.80 | 1.01/0.75 | 1550 |
| 355615 | 2.50 | 0.20 | 2.05 | 1.70 | 1.01/0.71 | 1550 |
| 353216 | 2.67 | 0.50 | 4.00 | 1.35 | 2.46/1.43 | 520 |
| 355160 | 2.70 | 0.60 | 4.00 | 2.40 | 3.00/2.44 | 780 |
| 355390 | 2.80 | 0.60 | 4.50 | 2.20 | 3.6/3.6 | 830 |
| 355440 | 2.80 | 0.5/0.3 | 4.70 | 7.1/2.7 | 4.12/3.76 | 980 |
| 355392 | 2.80 | 0.60 | 4.00 | 1.50 | 3.6/2.5 | 830 |
| 352440 | 3.00 | 0.30 | 4.70 | 6.90 | 4.0 /4.2 | 980 |
| 355660 | 3.00 | 0.50 | 4.00 | 1.60 | 3.6/2.35 | 1550 |
| 354330 | 3.10 | 0.70 | 6.33 | 1.80 | 5.0/3.84 | 830 |
| 355330 | 3.10 | 0.80 | 6.33 | 1.60 | 5.0/3.79 | 830 |

## Aspherical Lenses - Standard Product List

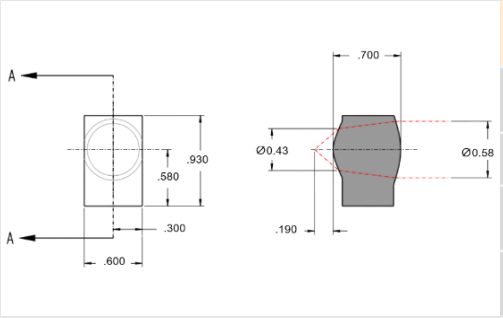
| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Clear Aperture | Design Wavelength |
|---|---|---|---|---|---|---|
| 352330 | 3.10 | 0.70 | 6.33 | 1.80 | 5.00/3.76 | 830 |
| 353515 | 3.50 | 0.40 | 3.00 | 2.30 | 2.70/1.95 | 515 |
| 355545 | 3.50 | 0.38 | 3.50 | 2.30 | 2.71/1.88 | 515 |
| 355970 | 3.70 | 0.20 | 3.40 | 3.00 | 1.56/1.3 | 1550 |
| 354943 | 3.80 | 0.18 | 1.82 | 3.06 | 1.37/1.12 | 980 |
| 352080 | 3.90 | 0.50 | 6.33 | 2.70 | 4.29/4.00 | 780 |
| 357610 | 4.00 | 0.60 | 6.33 | 2.70 | 4.8/3.39 | 410 |
| 357765 | 4.00 | 0.60 | 6.33 | 2.40 | 4.8/3.43 | 488 |
| 357775 | 4.00 | 0.60 | 6.33 | 2.40 | 4.8/3.45 | 408 |
| 352610 | 4.00 | 0.60 | 6.33 | 2.70 | 4.80/3.44 | 410 |
| 355940 | 4.00 | 0.20 | 3.00 | 3.40 | 1.37/1.16 | 1550 |
| 352671 | 4.00 | 0.60 | 6.33 | 2.40 | 4.80/3.52 | 408 |
| 354340 | 4.00 | 0.60 | 6.33 | 2.70 | 5.1/3.77 | 685 |
| 352340 | 4.00 | 0.60 | 6.33 | 2.70 | 5.1/3.8 | 685 |
| 355625 | 4.13 | 0.55 | 5.59 | 2.20 | 4.6/4.6 | 447 |
| 355022 | 4.50 | 0.50 | 5.42 | 3.10 | 4.2/2.77 | 780 |
| 352022 | 4.50 | 0.50 | 5.42 | 3.10 | 4.2/2.87 | 780 |
| 354350 | 4.50 | 0.40 | 4.70 | 2.20 | 3.7/2.05 | 980 |
| 354996 | 4.50 | 0.30 | 3.00 | 3.50 | 2.7/2.15 | 634 |
| 355230 | 4.50 | 0.60 | 6.33 | 3.10 | 5.07/3.93 | 780 |
| 352350 | 4.50 | 0.40 | 4.70 | 2.40 | 3.70/2.3 | 980 |
| 352230 | 4.50 | 0.60 | 6.33 | 2.90 | 4.95/4.5 | 780 |

**Aspherical Lenses - Standard Product List**

| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Clear Aperture | Design Wavelength |
|---|---|---|---|---|---|---|
| 354453 | 4.60 | 0.50 | 6.00 | 2.70 | 4.8/3.38 | 655 |
| 355317 | 4.80 | 0.27 | 6.15 | 3.80 | 2.6/2.12 | 940 |
| 354430 | 5.00 | 0.20 | 2.00 | 4.40 | 1.6/1.4 | 1550 |
| 354105 | 5.50 | 0.60 | 7.20 | 3.70 | 6.0/4.96 | 633 |
| 354132 | 5.70 | 0.20 | 3.00 | 4.60 | 2.5/2.08 | 974 |
| 354130 | 6.00 | 0.20 | 3.00 | 4.90 | 2.5/2.1 | 1550 |
| 354550 | 6.10 | 0.20 | 2.79 | 4.90 | 2.2/1.79 | 1550 |
| 354171 | 6.20 | 0.30 | 4.70 | 4.10 | 3.7/2.72 | 633 |
| 355110 | 6.20 | 0.40 | 7.20 | 3.50 | 5.0/2.93 | 780 |
| 352110 | 6.20 | 0.40 | 7.20 | 3.44 | 5.00/3.00 | 780 |
| 354525 | 6.70 | 0.44 | 6.65 | 4.90 | 5.75/4.66 | 515 |
| 352115 | 6.75 | 0.52 | 9.20 | 4.55 | 7.00/5.51 | 633 |
| 354115 | 6.80 | 0.50 | 9.20 | 4.30 | 7.00/5.30 | 633 |
| 355375 | 7.50 | 0.30 | 6.51 | 5.80 | 4.54/3.61 | 780 |
| 352-A375 | 7.50 | 0.30 | 6.49 | 5.80 | 4.50/3.63 | 780 |
| 354240 | 8.00 | 0.50 | 9.94 | 5.90 | 8.0/6.94 | 780 |
| 352240 | 8.00 | 0.50 | 9.94 | 5.90 | 8.00/7.00 | 780 |
| 354060 | 9.60 | 0.30 | 6.33 | 8.10 | 5.2/5.13 | 633 |
| 354306 | 9.90 | 0.30 | 6.34 | 8.40 | 5.2/4.57 | 650 |
| 354125 | 10.00 | 0.50 | 11.00 | 7.80 | 10.0/9.12 | 633 |
| 355561 | 10.00 | 0.60 | 15.00 | 7.00 | 12.5/10.5 | 850 |
| 354220 | 11.00 | 0.30 | 7.20 | 7.90 | 5.50/4.07 | 633 |
| 354061 | 11.00 | 0.20 | 6.33 | 9.60 | 5.2/4.63 | 633 |

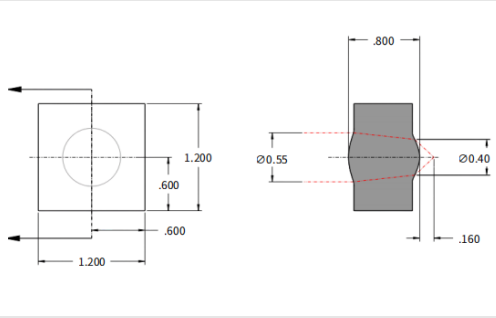
**Aspherical Lenses - Standard Product List**

| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Clear Aperture | Design Wavelength |
|---|---|---|---|---|---|---|
| 354062 | 11.00 | 0.20 | 6.00 | 9.70 | 5.2/4.68 | 633 |
| 354064 | 11.00 | 0.24 | 6.00 | 9.30 | 5.2/4.59 | 633 |
| 355397 | 11.00 | 0.30 | 7.20 | 10.00 | 6.68/6.24 | 670 |
| 352220 | 11.00 | 0.30 | 7.22 | 8.00 | 5.50/5.0 | 633 |
| 352-A397 | 11.00 | 0.30 | 7.18 | 9.70 | 6.59/6.07 | 670 |
| 354312 | 11.20 | 0.32 | 7.98 | 9.25 | 7.00/6.08 | 635 |
| 354058 | 12.00 | 0.20 | 6.33 | 10.60 | 5.2/5.2 | 633 |
| 354057 | 13.00 | 0.20 | 6.33 | 11.60 | 5.2/5.2 | 633 |
| 354560 | 13.90 | 0.20 | 6.33 | 12.10 | 5.1/4.54 | 650 |
| 354059 | 14.00 | 0.20 | 6.33 | 12.60 | 5.2/5.2 | 633 |
| 355510 | 14.50 | 0.30 | 10.00 | 12.20 | 8.00/8.00 | 900 |
| 375101 | 14.80 | 0.20 | 6.50 | 13.40 | 5.40/5.05 | 520 |
| 354120 | 15.00 | 0.20 | 4.99 | 13.20 | 4.5/4.0 | 670 |
| 354260 | 15.30 | 0.20 | 6.50 | 14.00 | 5.0/4.61 | 780 |
| 352260 | 15.30 | 0.20 | 6.50 | 14.00 | 5.00/4.8 | 780 |
| 354415 | 16.00 | 0.20 | 7.98 | 14.60 | 6.00/6.00 | 1064 |
| 354280 | 18.40 | 0.20 | 6.50 | 17.10 | 5.5/5.15 | 780 |
| 352280 | 18.40 | 0.20 | 6.50 | 17.10 | 5.50/5.20 | 780 |
| 354850 | 22.00 | 0.10 | 6.33 | 20.40 | 5.50/5.13 | 670 |
| 354068 | 25.00 | 0.30 | 17.20 | 22.10 | 13.03/12.28 | 945 |
| 354926 | 26.00 | 0.16 | 10.00 | 22.80 | 8.50/7.58 | 1559 |
| 354047 | 30.00 | 0.17 | 11.50 | 26.93 | 10.0/9.09 | 639 |
| 372900 | 50.00 | 0.23 | 25.00 | 46.00 | 23.0/22.0 | 780 |



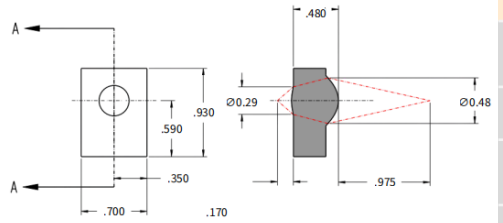

## 355089

| | |
|---|---|
| Design wavelength | 1310nm |
| Focal length | 0.30mm |
| Numerical Aperture | 0.65 |
| Clear Aperture | 0.43/0.58 |



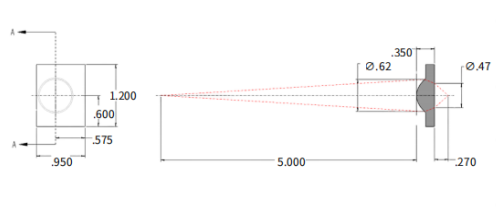

## 355865

| | |
|---|---|
| Design wavelength | 1577nm |
| Focal length | 0.40mm |
| Numerical Aperture | 0.68 |
| Clear Aperture | 0.55/0.40 |



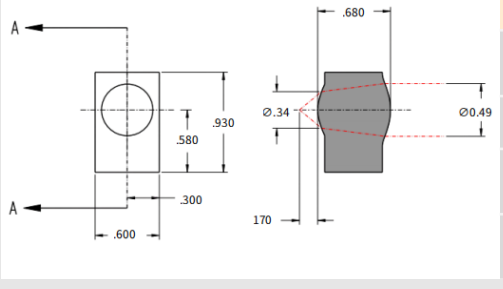

## 355104

| | |
|---|---|
| Design wavelength | 1300nm |
| Focal length | 0.30mm |
| Numerical Aperture | 0.65 |
| Clear Aperture | 0.29/0.48 |



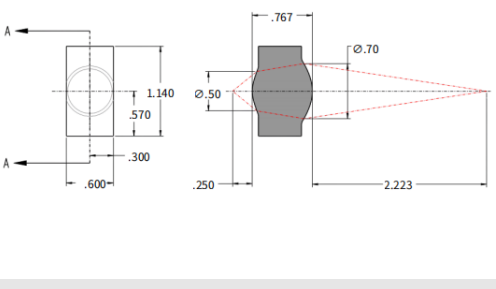

## 355070

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 0.40mm |
| Numerical Aperture | 0.1/0.7 |
| Clear Aperture | 0.62/0.47 |



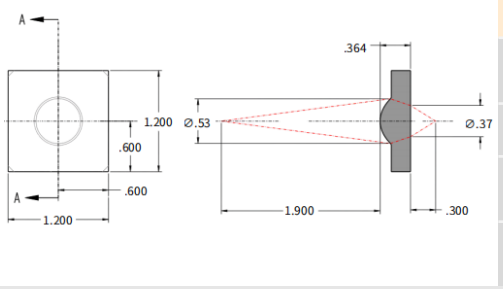

## 355641

| | |
|---|---|
| Design wavelength | 1310nm |
| Focal length | 0.38mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 0.34/0.49 |



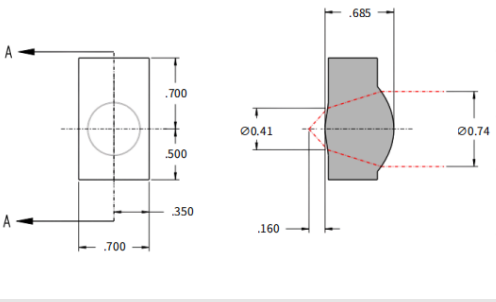

## 355204

| | |
|---|---|
| Design wavelength | 1310nm |
| Focal length | 0.45mm |
| Numerical Aperture | 0.55/0.10 |
| Clear Aperture | 0.50/0.70 |



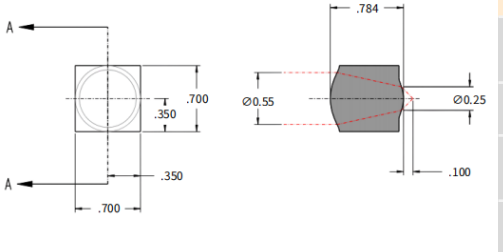

## 355631

| | |
|---|---|
| Design wavelength | 1310nm |
| Focal length | 0.40mm |
| Numerical Aperture | 0.6/0.1 |
| Clear Aperture | 0.37/0.53 |



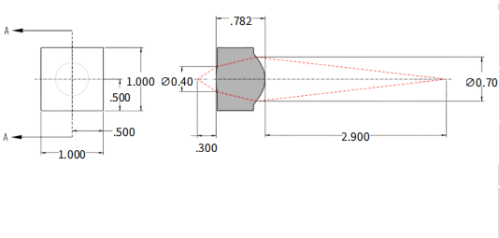

## 355207

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 0.50mm |
| Numerical Aperture | 0.65 |
| Clear Aperture | 0.43/0.58 |




## 355188

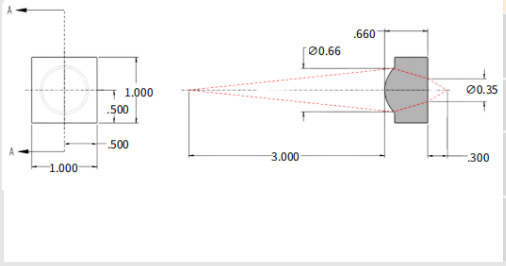
| | |
|---|---|
| Design wavelength | 1300nm |
| Focal length | 0.40mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 0.55/0.25 |




## 355465

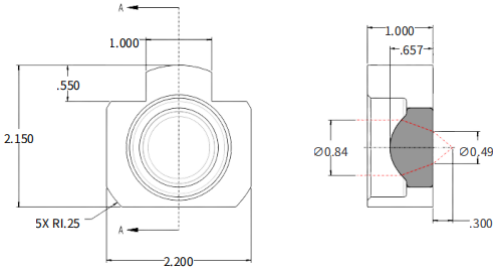
| | |
|---|---|
| Design wavelength | 1310nm |
| Focal length | 0.50mm |
| Numerical Aperture | 0.5/0.1 |
| Clear Aperture | 0.40/0.70 |

# VIS-NIR Aspherical Lens - Performance and Parameters



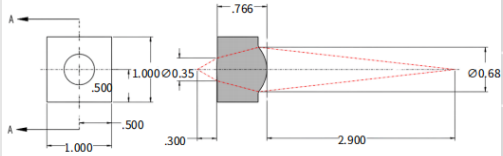

## 355485

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 0.60mm |
| Numerical Aperture | 0.50/0.10 |
| Clear Aperture | 0.35/0.66 |



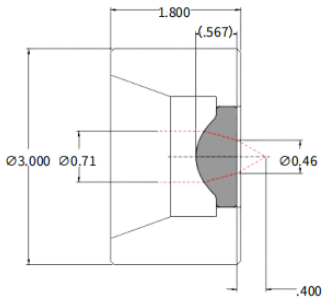

## 355885

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 0.70mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 0.84/0.49 |



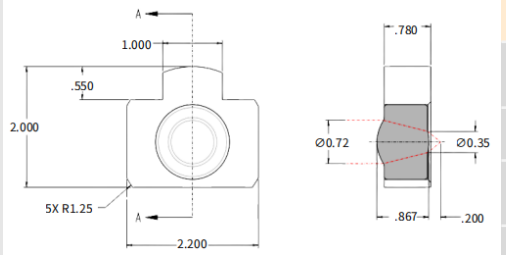

## 355487

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 0.60mm |
| Numerical Aperture | 0.50/0.10 |
| Clear Aperture | 0.35/0.68 |



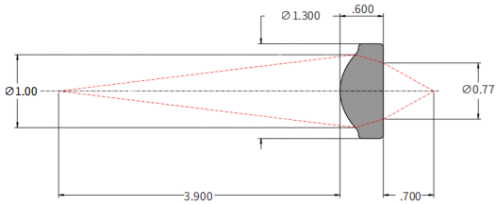

## 355840

| | |
|---|---|
| Design wavelength | 940nm |
| Focal length | 0.80mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 0.71/0.46 |



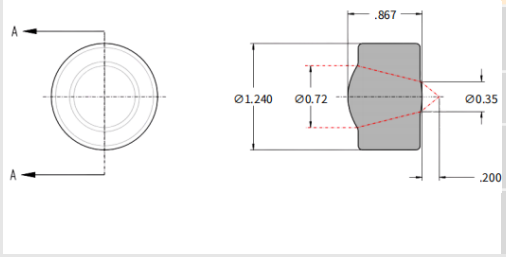

## 355536

| | |
|---|---|
| Design wavelength | 1310nm |
| Focal length | 0.60mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 0.72/0.35 |



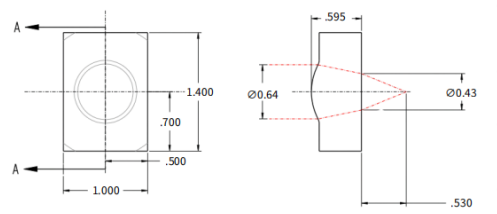

## 355915

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 0.80mm |
| Numerical Aperture | 0.10/0.50 |
| Clear Aperture | 1.00/0.77 |



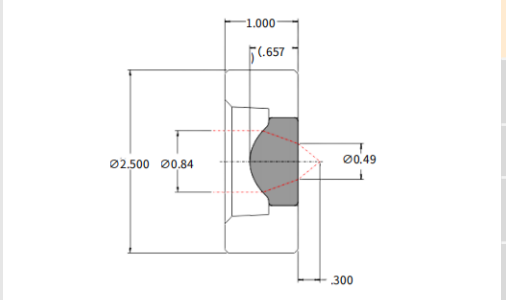

## 355537

| | |
|---|---|
| Design wavelength | 1310nm |
| Focal length | 0.60mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 0.72/0.35 |



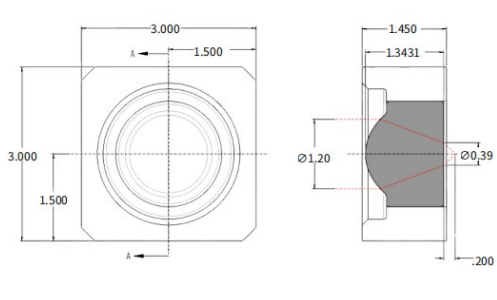

## 355236

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 0.86mm |
| Numerical Aperture | 0.35 |
| Clear Aperture | 0.64/0.43 |



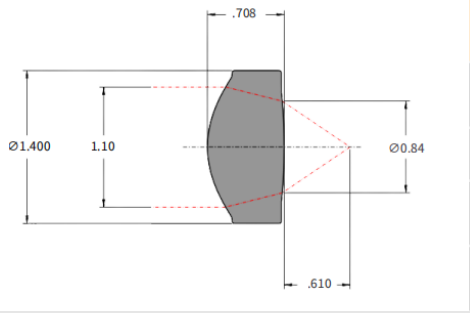

## 355880

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 0.70mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 0.84/0.49 |



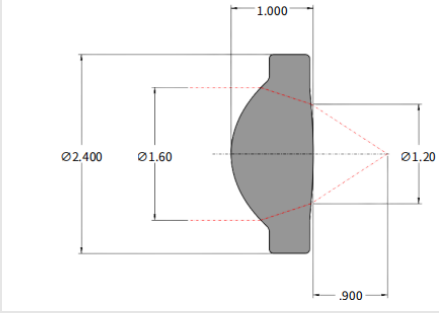

## 355960

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 1.00mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 1.2/0.39 |



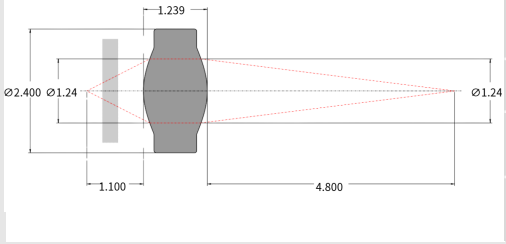

**355198**

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 1.05mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 1.10/0.84 |



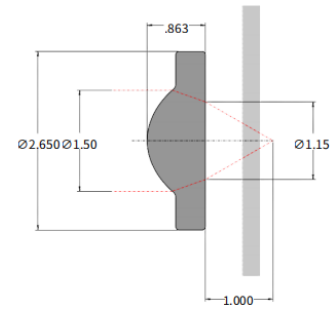

**352140**

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 1.50mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 1.60/1.20 |



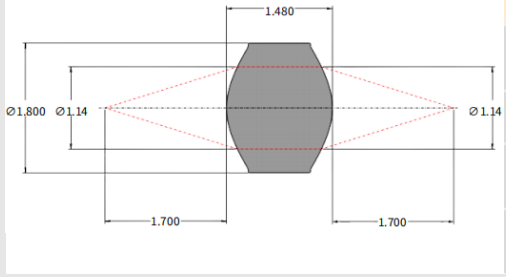

**355200**

| | |
|---|---|
| Design wavelength | 1300nm |
| Focal length | 1.10mm |
| Numerical Aperture | 0.4/0.1 |
| Clear Aperture | 1.24/1.24 |



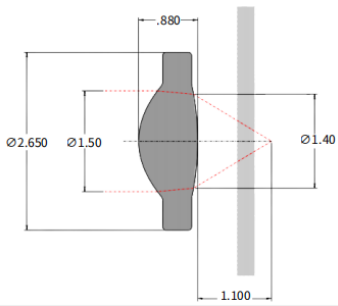

**354710**

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 1.50mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 1.5/1.15 |



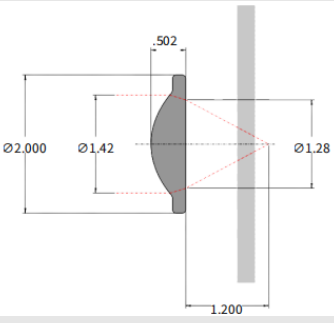

**354450**

| | |
|---|---|
| Design wavelength | 980nm |
| Focal length | 1.20mm |
| Numerical Aperture | 0.3/0.3 |
| Clear Aperture | 1.14/1.14 |



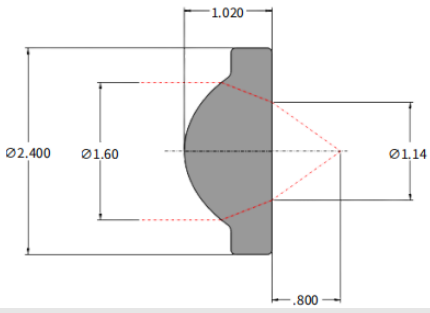

**352710**

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 1.50mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 1.50/1.40 |



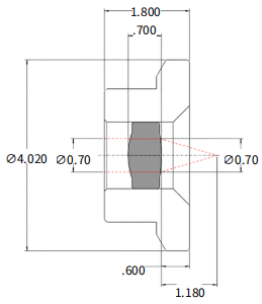

**357786**

| | |
|---|---|
| Design wavelength | 488nm |
| Focal length | 1.40mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 1.42/1.28 |



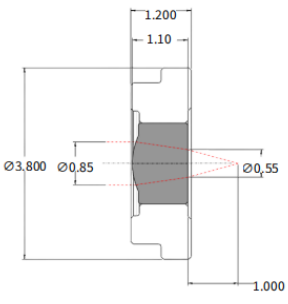

**354140**

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 1.50mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 1.6/1.14 |




**355182**

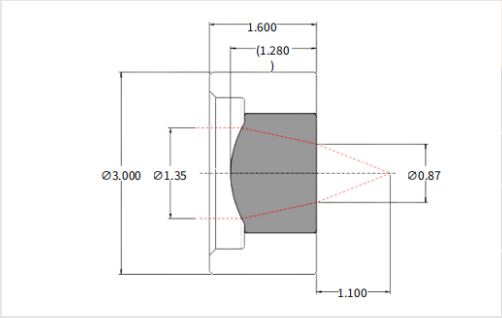
| | |
|---|---|
| Design wavelength | 1520-1570nm |
| Focal length | 1.48mm |
| Numerical Aperture | 0.21 |
| Clear Aperture | 0.70/0.70 |




**355086**

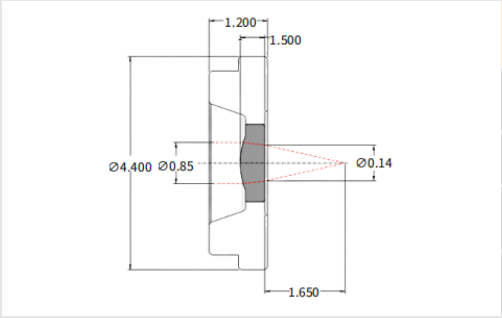
| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 1.67mm |
| Numerical Aperture | 0.25 |
| Clear Aperture | 0.85/0.55 |

# VIS-NIR Aspherical Lens - Performance and Parameters



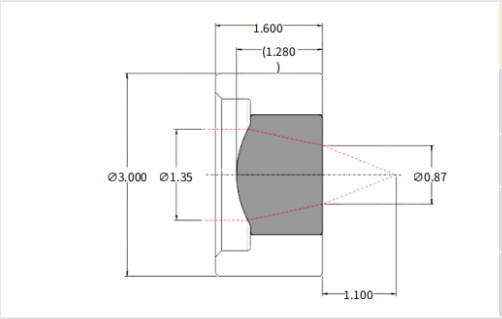

## 355949

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 1.80mm |
| Numerical Aperture | 0.40 |
| Clear Aperture | 1.35/0.87 |



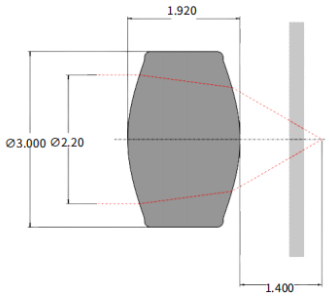

## 355087

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 1.98mm |
| Numerical Aperture | 0.21 |
| Clear Aperture | 0.85/0.74 |



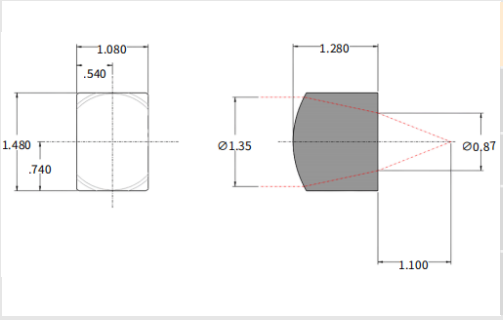

## 355950

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 1.80mm |
| Numerical Aperture | 0.40 |
| Clear Aperture | 1.35/0.87 |



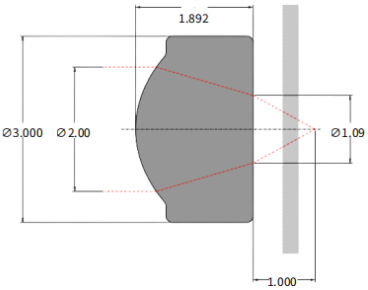

## 355150

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 2.00mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 2.20/2.20 |



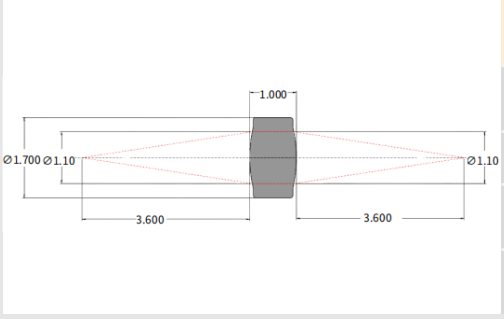

## 355951

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 1.80mm |
| Numerical Aperture | 0.40 |
| Clear Aperture | 1.35/0.87 |



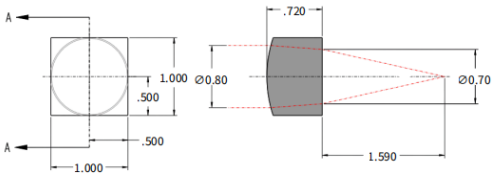

## 355151

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 2.00mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 2.00/1.09 |



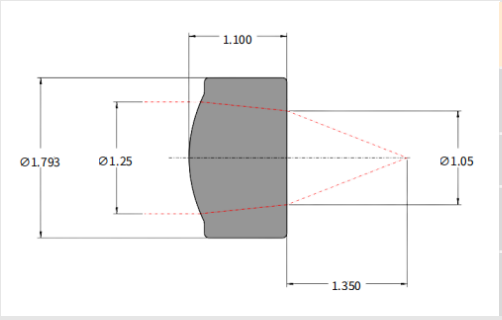

## 355755

| | |
|---|---|
| Design wavelength | 1577nm |
| Focal length | 1.90mm |
| Numerical Aperture | 0.2/0.2 |
| Clear Aperture | 1.10/1.10 |



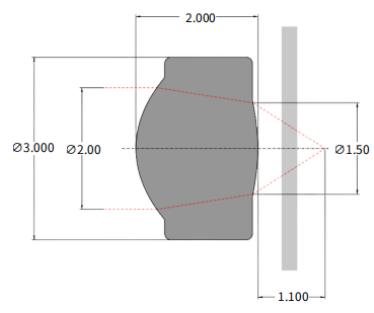

## 355215

| | |
|---|---|
| Design wavelength | 1585nm |
| Focal length | 2.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 0.8/0.7 |



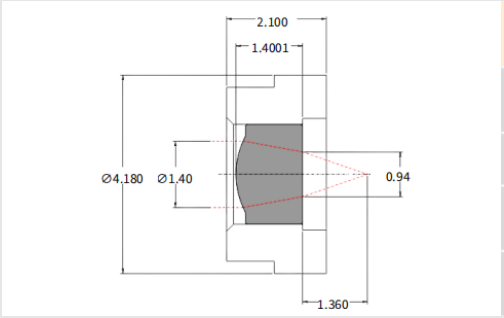

## 355860

| | |
|---|---|
| Design wavelength | 1310nm |
| Focal length | 1.97mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 1.25/1.05 |



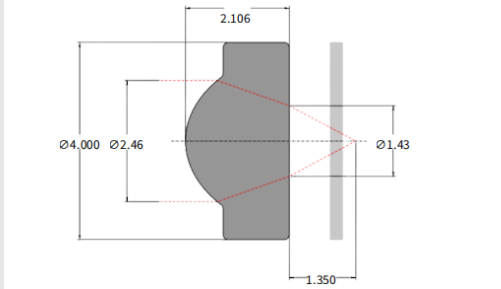

## 352150

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 2.00mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 2.00/1.50 |



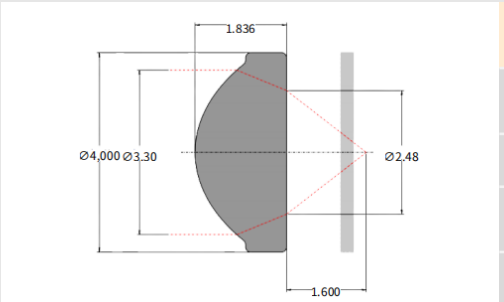

## 355290

| | |
|---|---|
| Design wavelength | 1310nm |
| Focal length | 2.15mm |
| Numerical Aperture | 0.33 |
| Clear Aperture | 1.4/0.94 |



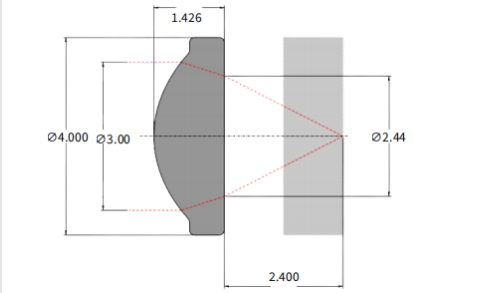

## 353216

| | |
|---|---|
| Design wavelength | 520nm |
| Focal length | 2.67mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 2.46/1.43 |



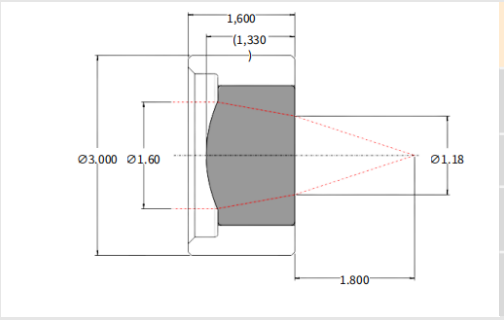

## 357300

| | |
|---|---|
| Design wavelength | 405nm |
| Focal length | 2.50mm |
| Numerical Aperture | 0.70 |
| Clear Aperture | 3.3/2.48 |



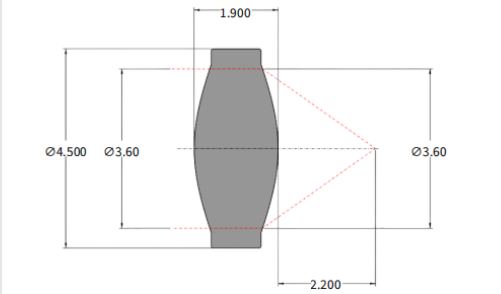

## 355160

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 2.70mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 3.00/2.44 |



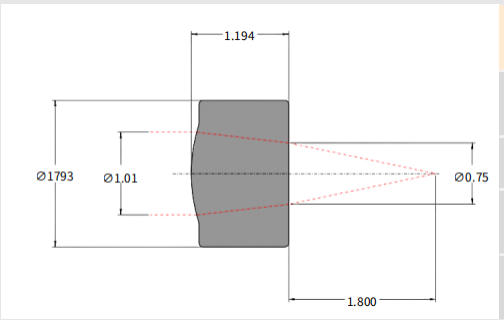

## 355945

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 2.50mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 1.6/1.18 |



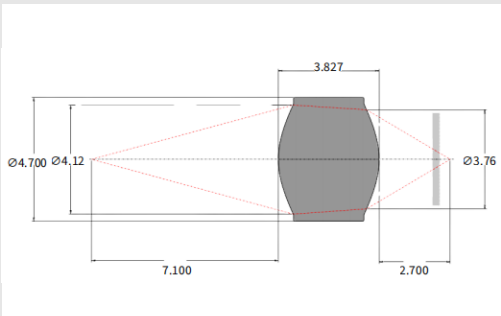

## 355390

| | |
|---|---|
| Design wavelength | 830nm |
| Focal length | 2.80mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 3.6/3.6 |



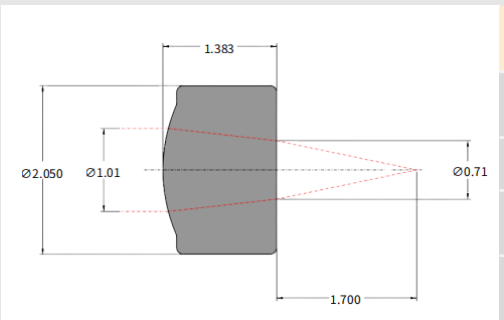

## 355410

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 2.50mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 1.01/0.75 |



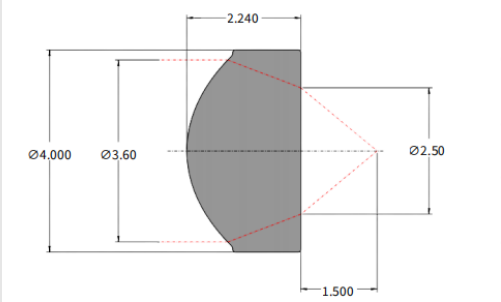

## 355440

| | |
|---|---|
| Design wavelength | 980nm |
| Focal length | 2.80mm |
| Numerical Aperture | 0.5/0.3 |
| Clear Aperture | 4.12/3.76 |




## 355615

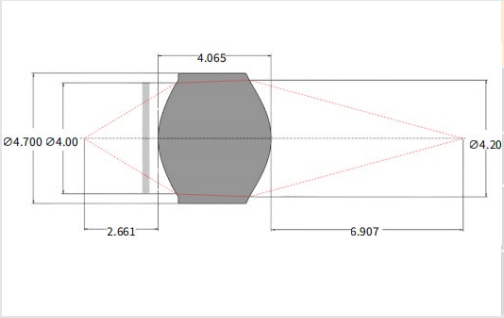
| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 2.50mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 1.01/0.71 |




## 355392

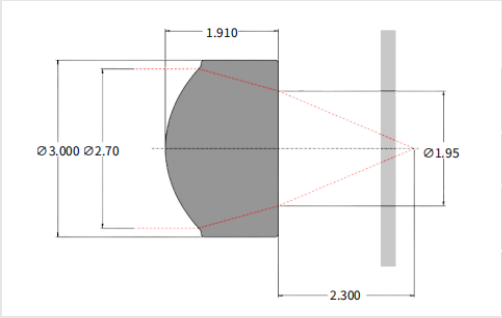
| | |
|---|---|
| Design wavelength | 830nm |
| Focal length | 2.80mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 3.6/2.5 |

# VIS-NIR Aspherical Lens - Performance and Parameters



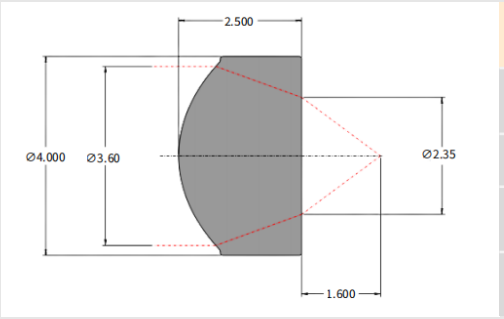

## 352440

| | |
|---|---|
| Design wavelength | 980nm |
| Focal length | 3.00mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 4.00/4.20 |



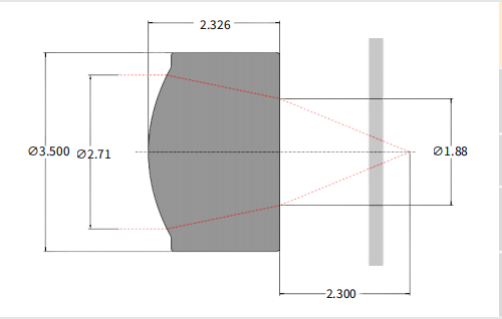

## 353515

| | |
|---|---|
| Design wavelength | 515nm |
| Focal length | 3.50mm |
| Numerical Aperture | 0.40 |
| Clear Aperture | 2.70/1.95 |



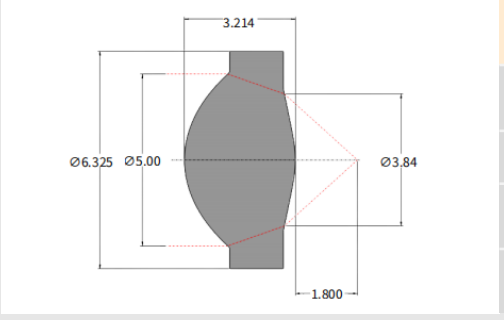

## 355660

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 3.00mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 3.6/2.35 |



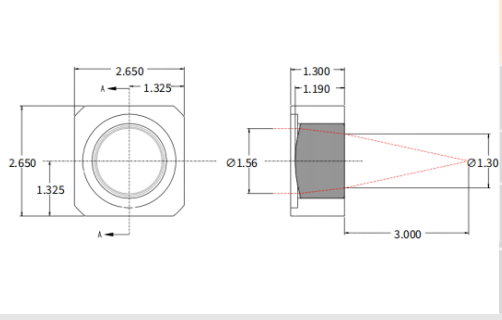

## 355545

| | |
|---|---|
| Design wavelength | 515nm |
| Focal length | 3.50mm |
| Numerical Aperture | 0.38 |
| Clear Aperture | 2.71/1.88 |



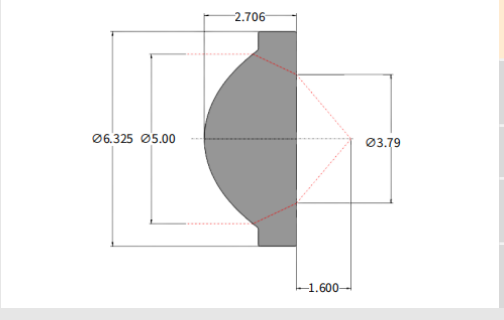

## 354330

| | |
|---|---|
| Design wavelength | 830nm |
| Focal length | 3.10mm |
| Numerical Aperture | 0.70 |
| Clear Aperture | 5.0/3.84 |



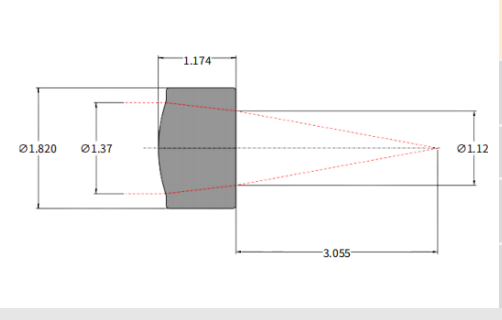

## 355970

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 3.70mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 1.56/1.3 |



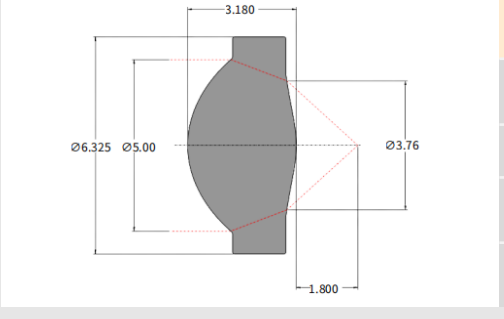

## 355330

| | |
|---|---|
| Design wavelength | 830nm |
| Focal length | 3.10mm |
| Numerical Aperture | 0.80 |
| Clear Aperture | 5.0/3.79 |



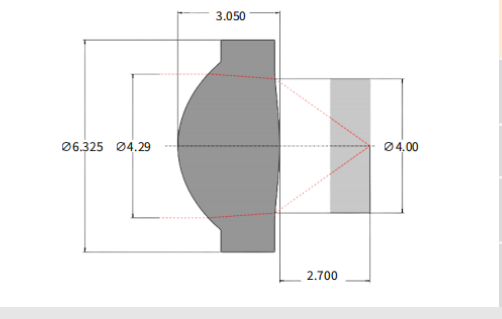

## 354943

| | |
|---|---|
| Design wavelength | 980nm |
| Focal length | 3.80mm |
| Numerical Aperture | 0.18 |
| Clear Aperture | 1.37/1.12 |



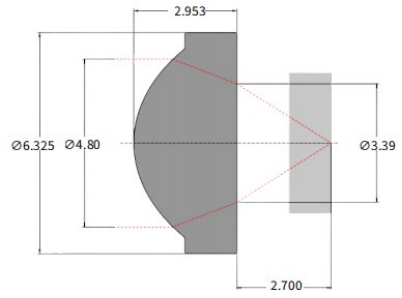

## 352330

| | |
|---|---|
| Design wavelength | 830nm |
| Focal length | 3.10mm |
| Numerical Aperture | 0.70 |
| Clear Aperture | 5.0/3.76 |



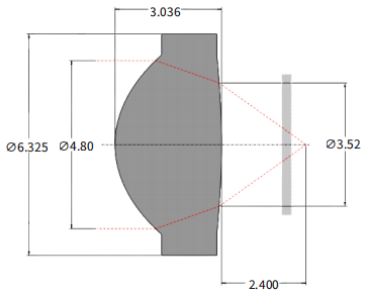

## 352080

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 3.90mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 4.29/4.00 |



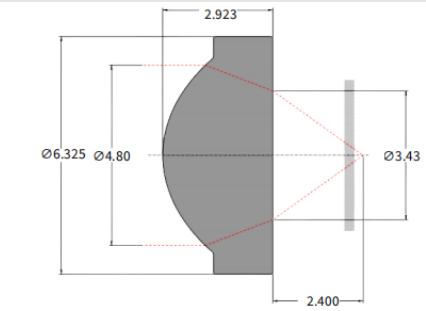

## 357610

| | |
|---|---|
| Design wavelength | 410nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 4.8/3.39 |



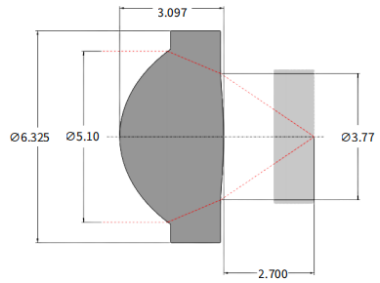

## 352671

| | |
|---|---|
| Design wavelength | 408nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 4.80/3.52 |



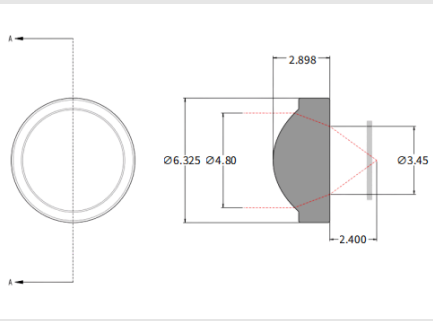

## 357765

| | |
|---|---|
| Design wavelength | 488nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 4.8/3.43 |



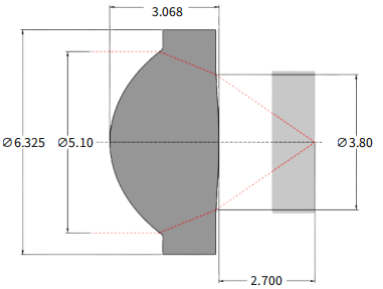

## 354340

| | |
|---|---|
| Design wavelength | 685nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 5.1/3.77 |



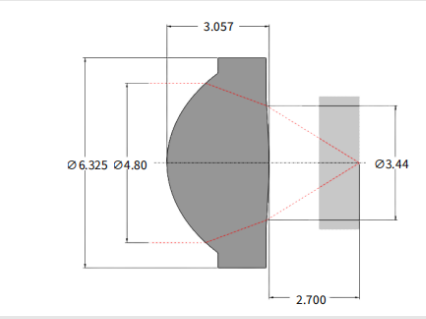

## 357775

| | |
|---|---|
| Design wavelength | 408nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 4.8/3.45 |



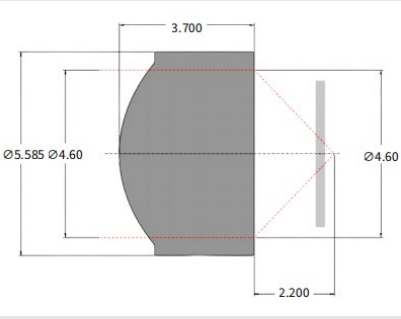

## 352340

| | |
|---|---|
| Design wavelength | 685nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 5.1/3.8 |



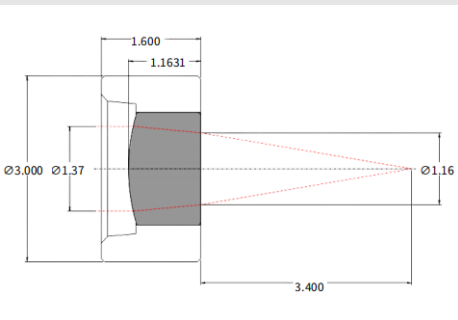

## 352610

| | |
|---|---|
| Design wavelength | 410nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 4.80/3.44 |



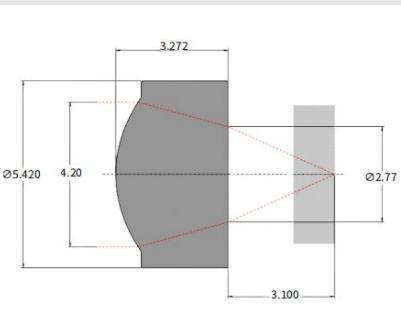

## 355625

| | |
|---|---|
| Design wavelength | 447nm |
| Focal length | 4.13mm |
| Numerical Aperture | 0.55 |
| Clear Aperture | 4.6/4.6 |




## 355940

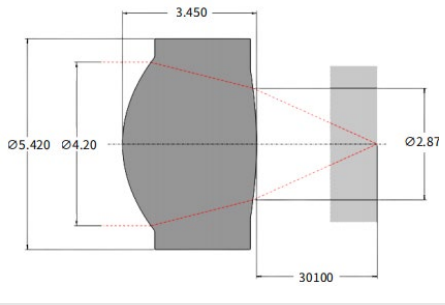
| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 1.37/1.16 |



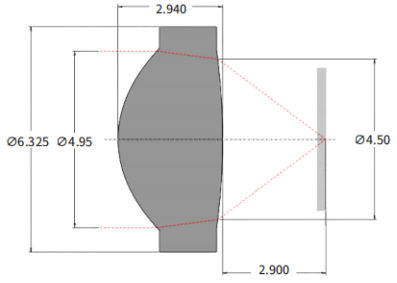

## 355022

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 4.50mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 4.2/2.77 |

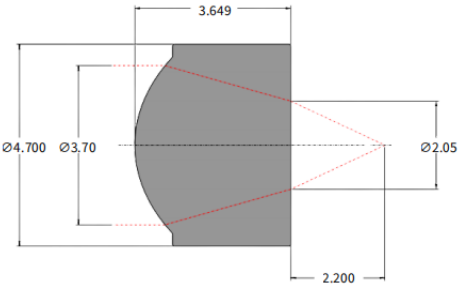
# VIS-NIR Aspherical Lens - Performance and Parameters



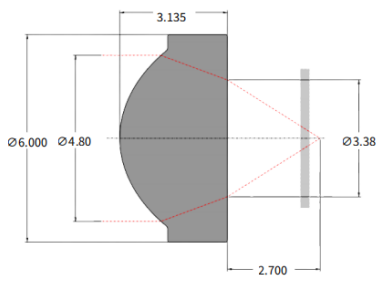

| 352022 | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 4.50mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 4.2/2.87 |



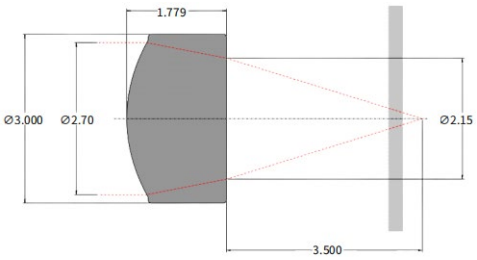

| 352230 | |
|---|---|
| Design wavelength | 782nm |
| Focal length | 4.50mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 4.95/4.5 |



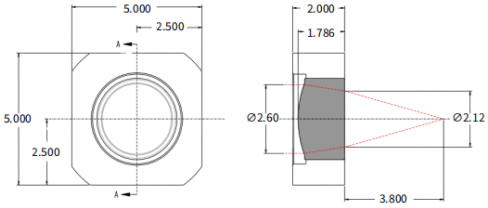

| 354350 | |
|---|---|
| Design wavelength | 980nm |
| Focal length | 4.50mm |
| Numerical Aperture | 0.40 |
| Clear Aperture | 3.7/2.05 |



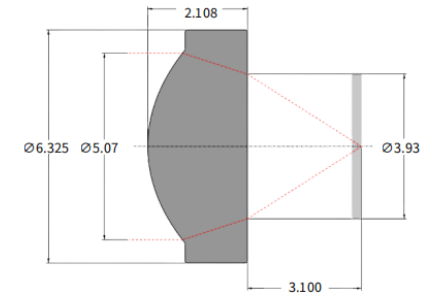

| 354453 | |
|---|---|
| Design wavelength | 655nm |
| Focal length | 4.60mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 4.8/3.38 |



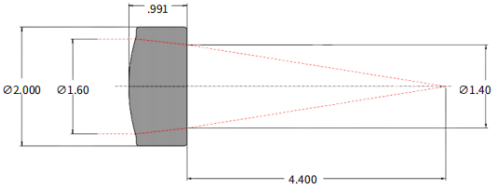

| 354996 | |
|---|---|
| Design wavelength | 634nm |
| Focal length | 4.50mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 2.7/2.15 |



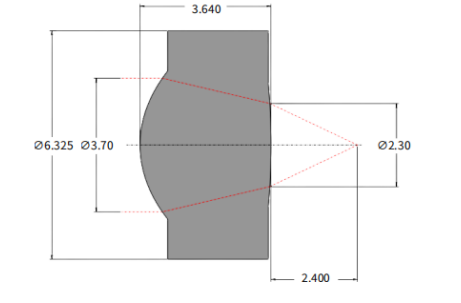

| 355317 | |
|---|---|
| Design wavelength | 940nm |
| Focal length | 4.80mm |
| Numerical Aperture | 0.27 |
| Clear Aperture | 2.6/2.12 |



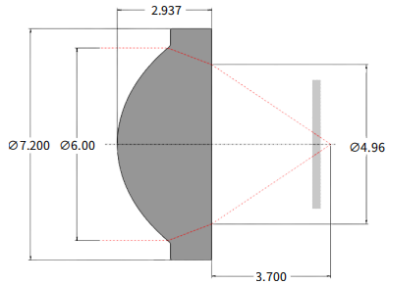

| 355230 | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 4.50mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 5.07/3.93 |



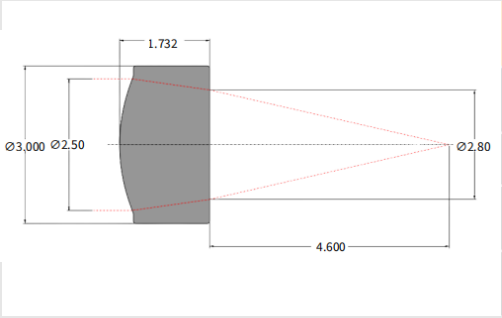

| 354430 | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 5.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 1.6/1.4 |




| 352350 | |
|---|---|
| Design wavelength | 980nm |
| Focal length | 4.50mm |
| Numerical Aperture | 0.40 |
| Clear Aperture | 3.70/2.3 |

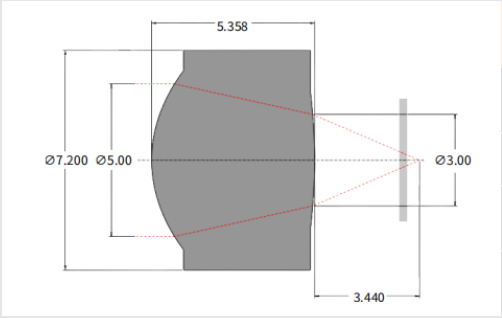



| 354105 | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 5.50mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 6.0/4.96 |



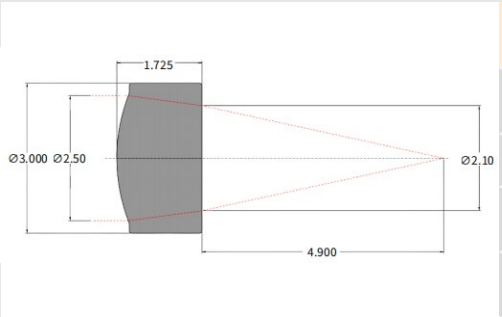

## 354132

| | |
|---|---|
| Design wavelength | 974nm |
| Focal length | 5.70mm |
| Numerical Aperture | 0.2 |
| Clear Aperture | 2.5/2.08 |



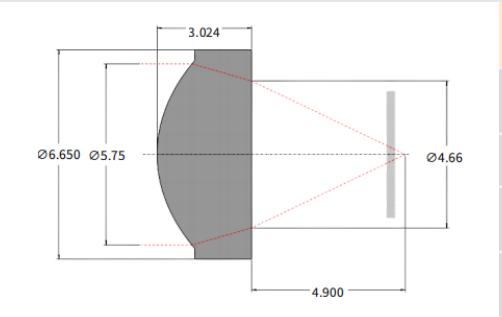

## 352110

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 6.20mm |
| Numerical Aperture | 0.40 |
| Clear Aperture | 5.00/3.00 |



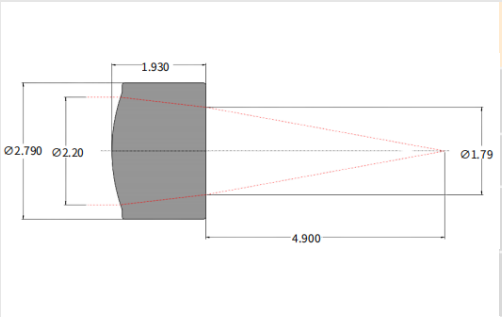

## 354130

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 6.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 2.5/2.1 |



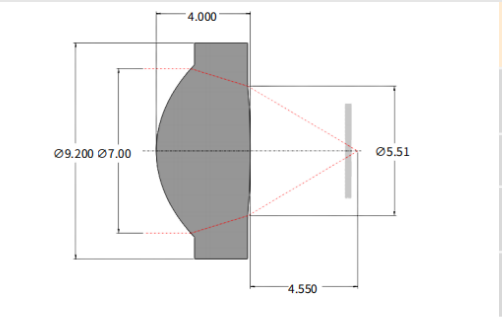

## 354525

| | |
|---|---|
| Design wavelength | 515nm |
| Focal length | 6.70mm |
| Numerical Aperture | 0.44 |
| Clear Aperture | 5.75/4.66 |



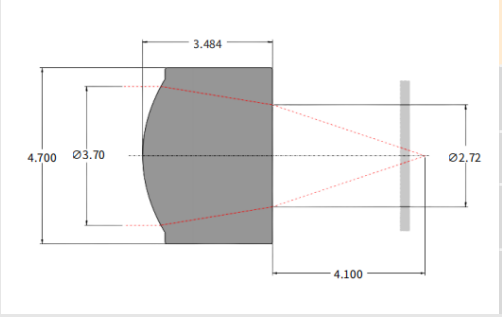

## 354550

| | |
|---|---|
| Design wavelength | 1550nm |
| Focal length | 6.10mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 2.2/1.79 |



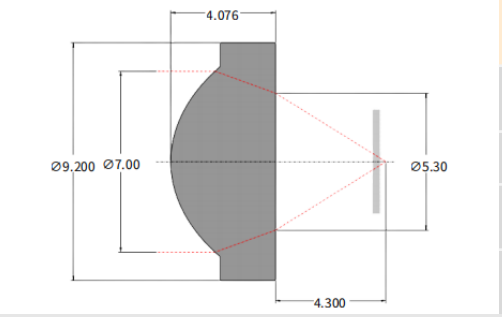

## 352115

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 6.75mm |
| Numerical Aperture | 0.52 |
| Clear Aperture | 7.00/5.51 |



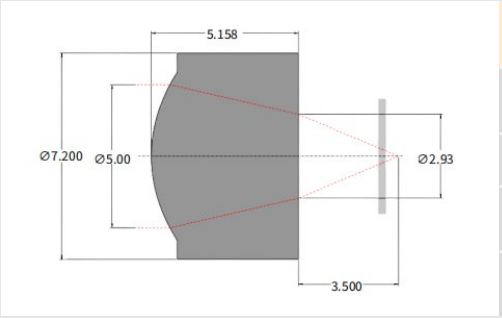

## 354171

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 6.20mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 3.7/2.72 |



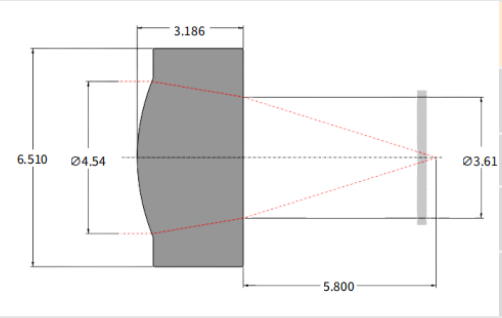

## 354115

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 6.80mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 7.00/5.30 |



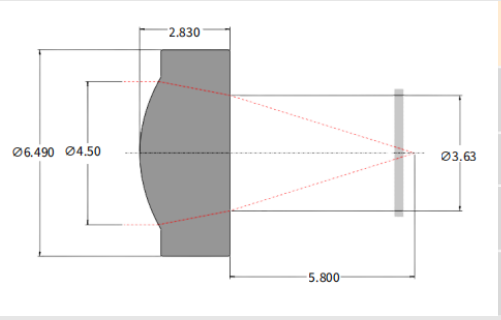

## 355110

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 6.20mm |
| Numerical Aperture | 0.40 |
| Clear Aperture | 5.0/2.93 |



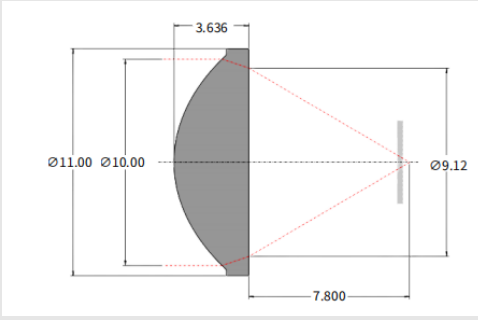

## 355375

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 7.50mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 4.54/3.61 |



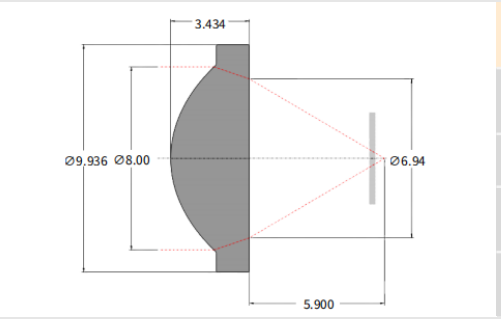

## 352-A375

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 7.50mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 4.50/3.63 |



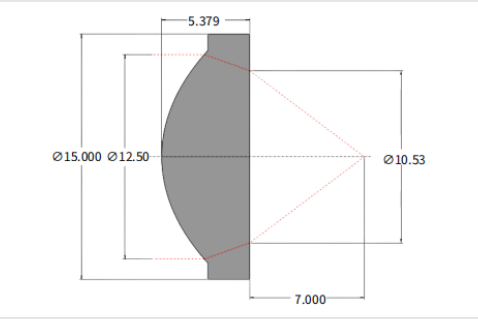

## 354125

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 10.00mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 10.0/9.12 |



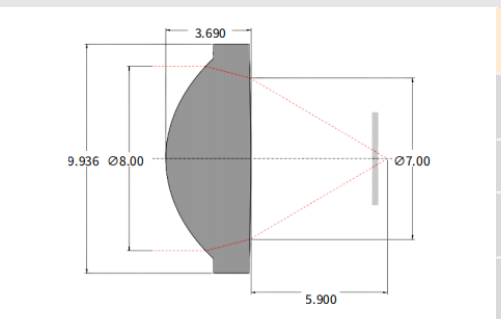

## 354240

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 8.00mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 8.0/6.94 |



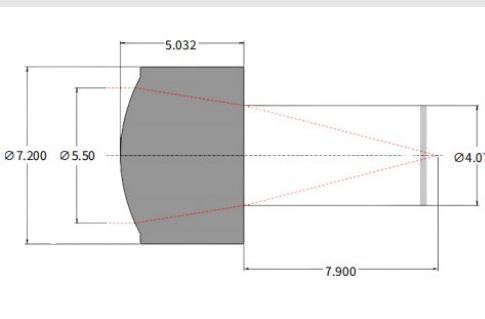

## 355561

| | |
|---|---|
| Design wavelength | 850nm |
| Focal length | 10.00mm |
| Numerical Aperture | 0.60 |
| Clear Aperture | 12.5/10.53 |



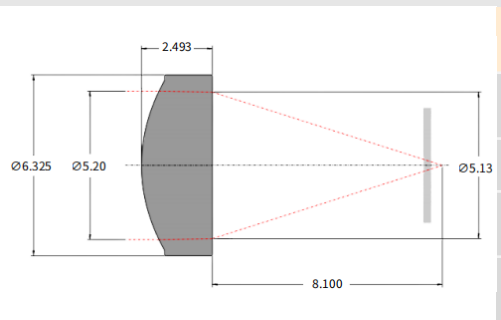

## 352240

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 8.00mm |
| Numerical Aperture | 0.50 |
| Clear Aperture | 8.00/7.00 |



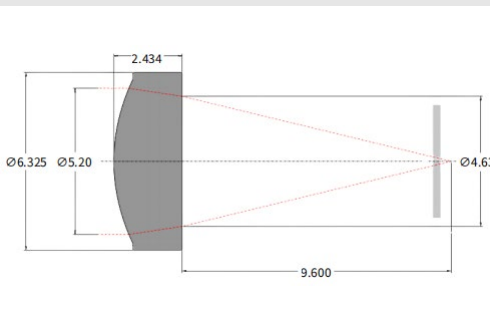

## 354220

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 11.00mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 5.50/4.07 |



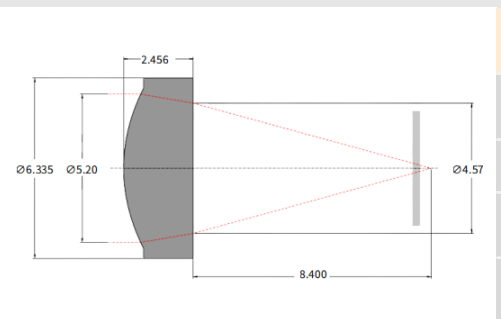

## 354060

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 9.60mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 5.2/5.13 |



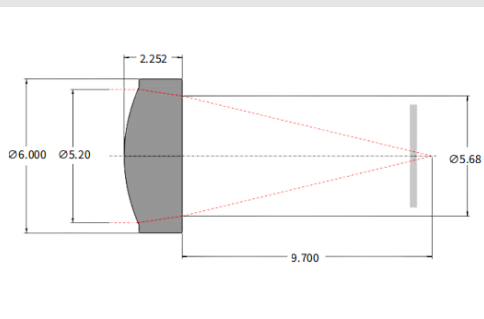

## 354061

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 11.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.2/4.63 |



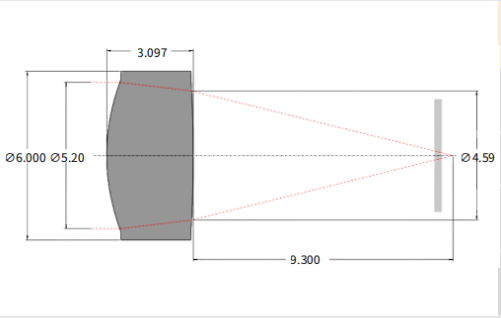

## 354306

| | |
|---|---|
| Design wavelength | 650nm |
| Focal length | 9.90mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 5.2/4.57 |



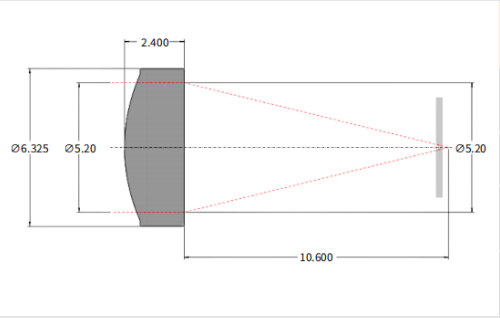

## 354062

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 11.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.2/4.68 |



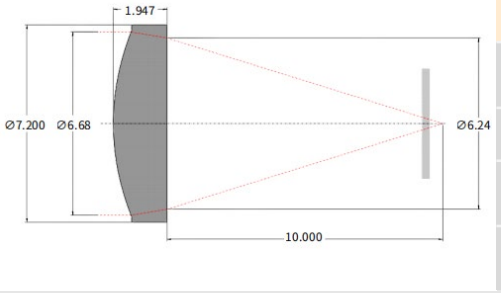

**354064**

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 11.00mm |
| Numerical Aperture | 0.24 |
| Clear Aperture | 5.2/4.59 |



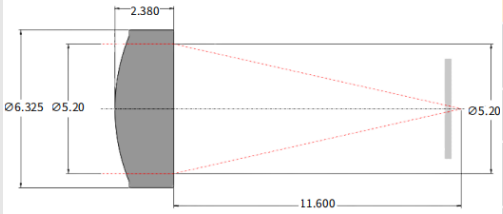

**354058**

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 12.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.2/5.2 |



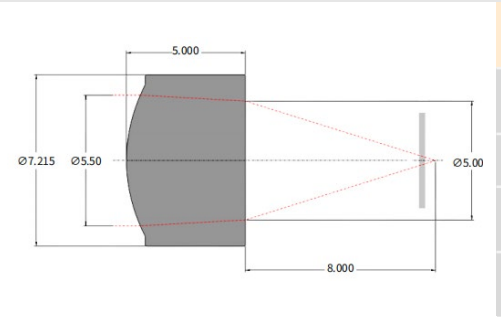

**355397**

| | |
|---|---|
| Design wavelength | 670nm |
| Focal length | 11.00mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 6.68/6.24 |



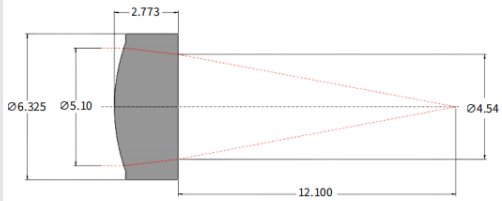

**354057**

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 13.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.2/5.2 |



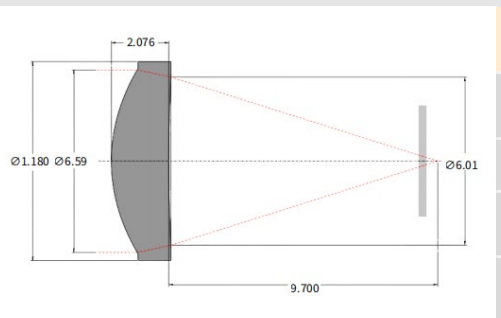

**352220**

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 11.00mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 5.50/5.0 |



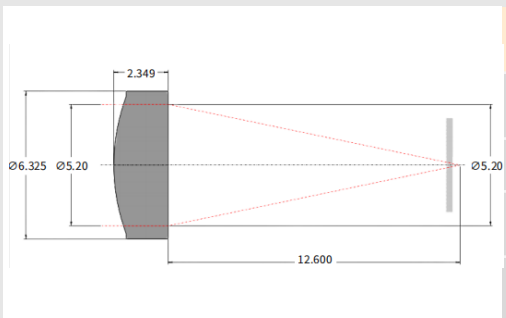

**354560**

| | |
|---|---|
| Design wavelength | 650nm |
| Focal length | 13.90mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.1/4.54 |



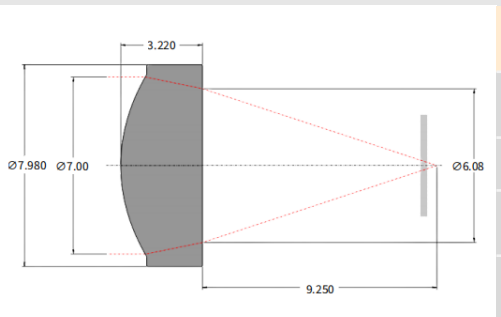

**352-A397**

| | |
|---|---|
| Design wavelength | 670nm |
| Focal length | 11.00mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 6.59/6.07 |



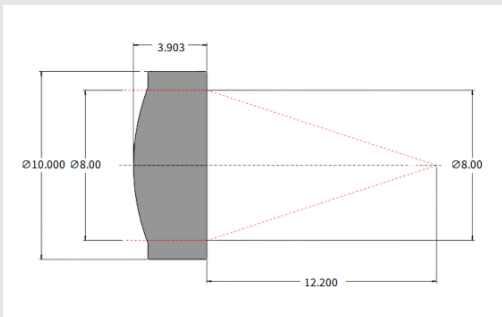

**354059**

| | |
|---|---|
| Design wavelength | 633nm |
| Focal length | 14.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.2/5.2 |




**354312**

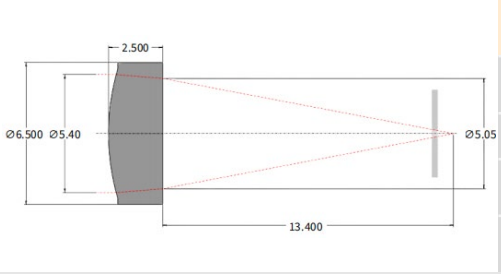
| | |
|---|---|
| Design wavelength | 635nm |
| Focal length | 11.20mm |
| Numerical Aperture | 0.32 |
| Clear Aperture | 7.00/6.08 |




**355510**

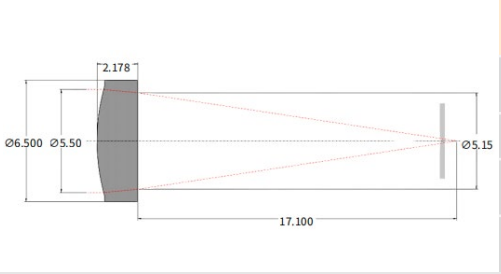
| | |
|---|---|
| Design wavelength | 900nm |
| Focal length | 14.50mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 8.00/8.00 |

# VIS-NIR Aspherical Lens - Performance and Parameters



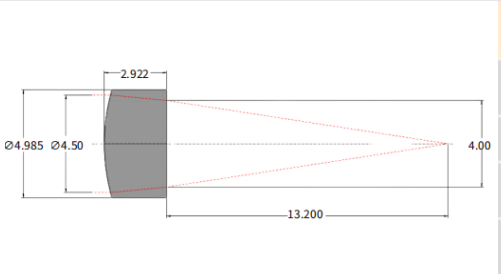

## 375101

| | |
|---|---|
| Design wavelength | 520nm |
| Focal length | 14.80mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.40/5.05 |



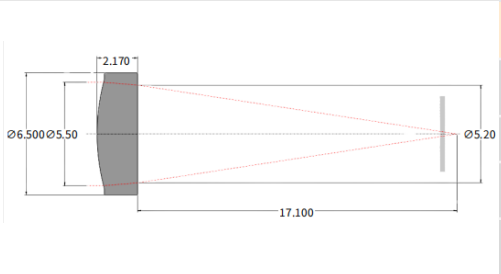

## 354280

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 18.40mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.5/5.15 |



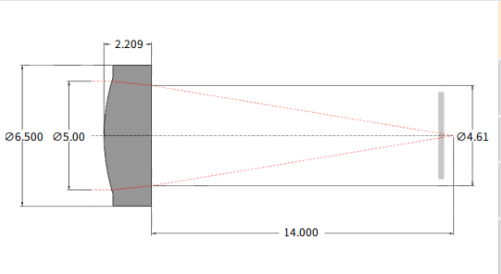

## 354120

| | |
|---|---|
| Design wavelength | 670nm |
| Focal length | 15.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 4.5/4.0 |



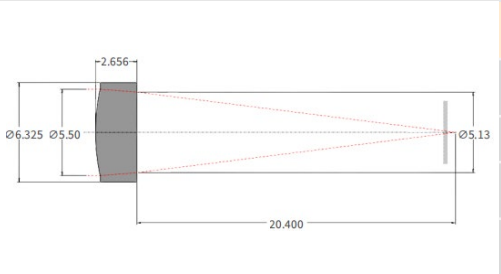

## 352280

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 18.40mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.50/5.20 |



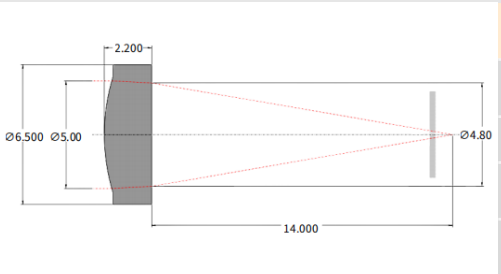

## 354260

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 15.30mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.0/4.61 |



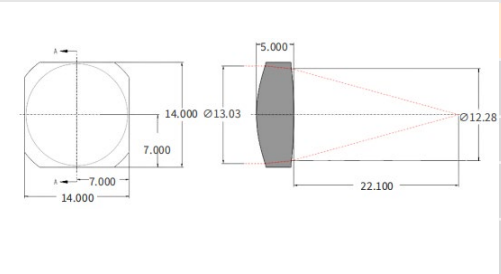

## 354850

| | |
|---|---|
| Design wavelength | 670nm |
| Focal length | 22.00mm |
| Numerical Aperture | 0.10 |
| Clear Aperture | 5.50/5.13 |



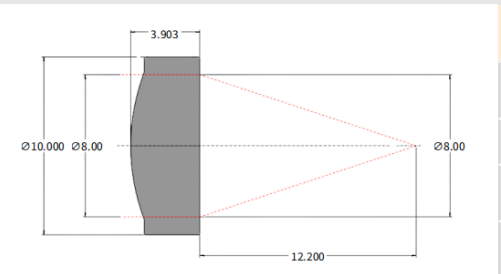

## 352260

| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 15.30mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.00/4.8 |



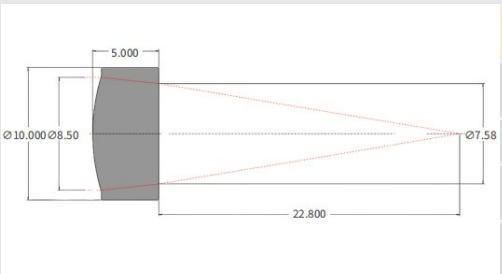

## 354068

| | |
|---|---|
| Design wavelength | 945nm |
| Focal length | 25.00mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 13.03/12.28 |



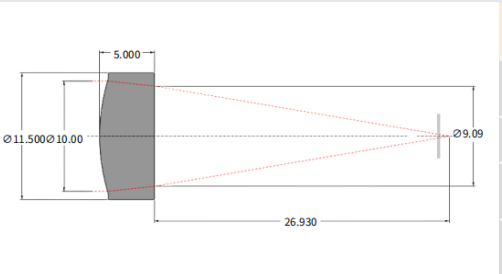

## 354415

| | |
|---|---|
| Design wavelength | 1064nm |
| Focal length | 16.00mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 6.00/6.00 |



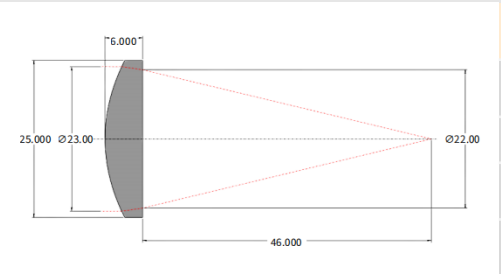

## 354926

| | |
|---|---|
| Design wavelength | 1559nm |
| Focal length | 26.00mm |
| Numerical Aperture | 0.16 |
| Clear Aperture | 8.50/7.58 |




## 354047

| | |
|---|---|
| Design wavelength | 639nm |
| Focal length | 30.00mm |
| Numerical Aperture | 0.17 |
| Clear Aperture | 10.0/9.09 |




## 372900

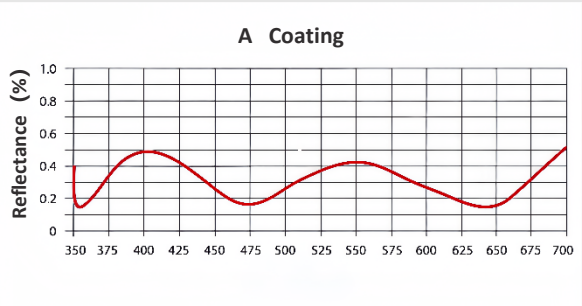
| | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 50.00mm |
| Numerical Aperture | 0.23 |
| Clear Aperture | 23.0/22.0 |

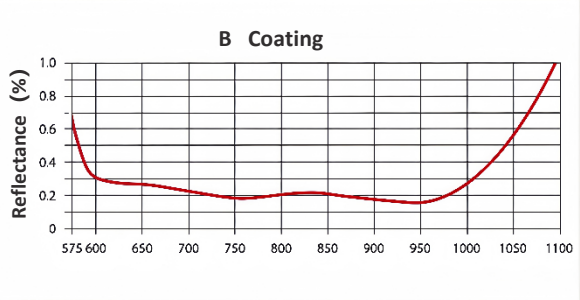
## Standard VIS-NIR AR Coating

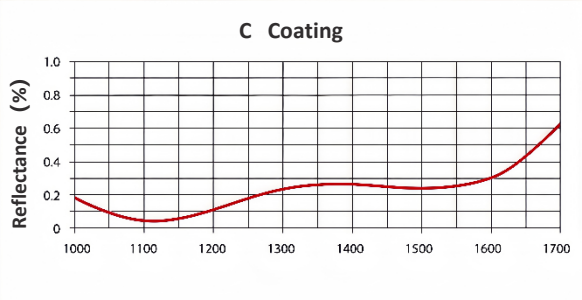
LightPath offers a variety of broadband anti-reflection (AR) coatings specifically developed for visible and near-infrared laser applications. These coatings can protect the lens surface and significantly increase the lens's transmittance. The choice of the appropriate AR coating depends on the type of glass of the lens and the wavelength range of the application.

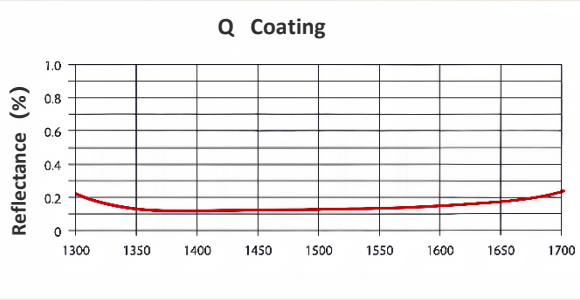
| Standard VIS-NIR AR Coating | | |
|---|---|---|
| **Coating Code** | **λ Range(nm)** | **Reflectance(%)** |
| **A** | **350 - 700** | **Ravg < 0.50%** |
| **B** | **600 - 1050** | **Rmax < 1.00%** |
| **C** | **1050 - 1600** | **Rmax < 1.00%** |
| **Q** | **1300 - 1700** | **Rmax < 0.25%** |
| **UVA** | **350 - 500** | **Rmax < 1.00%** |

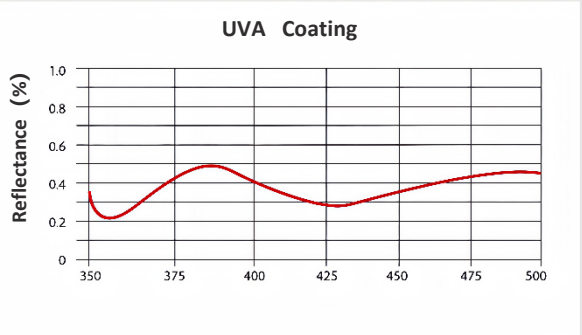
## Typical VIS-NIR AR Coating Curves




Lens drawings and ZEMAX files can be accessed on our website: www.lightpath.com.cn

## Excellent Glass Performance And Suitability For High-Volume Precision Molding Production

| Lens Code | Glass Type | Refractive Index | Abbe number | CTE | dn/dT | Equivalent Glasses | RoHS |
|---|---|---|---|---|---|---|---|
| 352xxx | ECO-550 | 1.603 | 50.02 | 11.62 x 10-6/°C | 2.39 x 10-6/°C | N/A | ✓ |
| 353xxx | H-FK61 | 1.495 | 81.20 | 13.8 x 10-6/°C | -6.6 x 10-6/°C | Hoya-FCD1 & Ohara S-FPL51 | ✓ |
| 354xxx | D-ZK3 | 1.586 | 60.71 | 7.6 x 10-6/°C | 3.2 x 10-6/°C | Hoya M-BACD5N & Ohara L-BAL35 | ✓ |
| 355xxx | D-ZLaF52La | 1.806 | 40.79 | 6.9 x 10-6/°C | 6.5 x 10-6/°C | Ohara L-LAH53, Hoya M-NBFD130, Sumita K-VC89 | ✓ |
| 357xxx | D-LaK6 | 1.690 | 52.65 | 6.9 x 10-6/°C | 6.5 x 10-6/°C | Hoya M-LAC130 & Ohara L-LAL13 | ✓ |

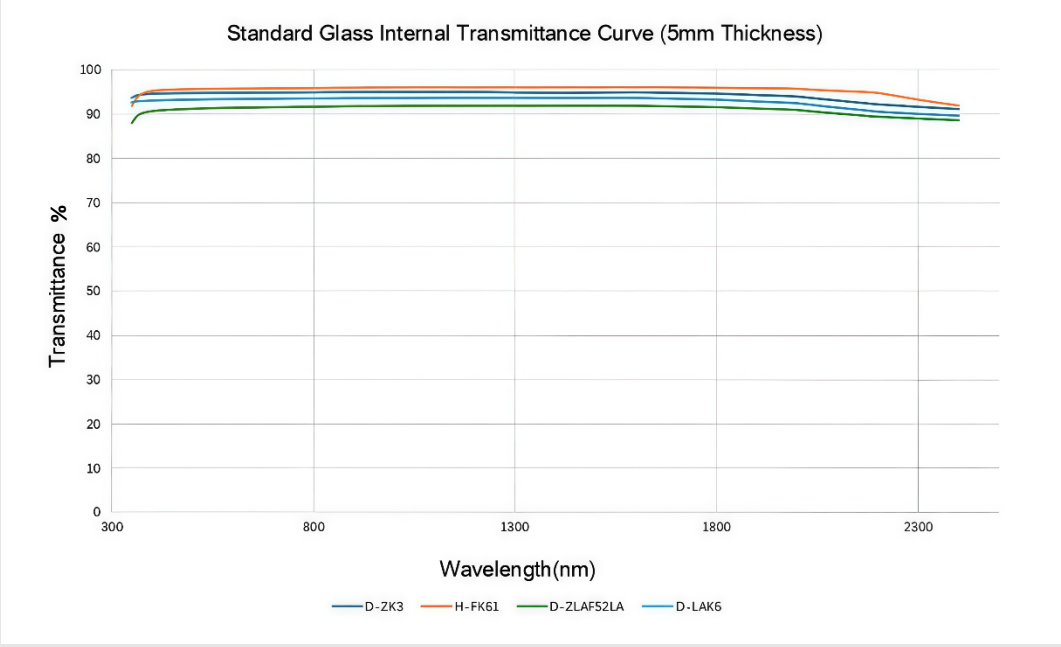
**EC0-550 → 352xxx Series of Lenses**
Ultra-low-Tg optical glass can be precision-molded using nickel molds, resulting in lenses with extremely high surface accuracy.

**H-FK61 → 353xxx Series of Lenses**
**I**t features low dispersion and excellent ultraviolet (UV) transmission properties.

**D-ZK3 → 354xxx Series of Lenses**
Suitable for applications that require low-cost glass for large-scale manufacturing.

**D-ZlaF52La → 355xxx Series of Lenses**
It has a relatively high refractive index and is suitable for applications requiring a high numerical aperture.

**D-LaK6 → 357xxx Series of Lenses**
It has excellent ultraviolet and blue light transmission properties.




## Types Of Special Glass

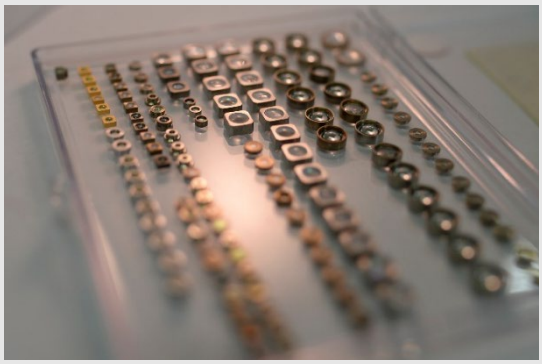
There are a wide variety of moldable low-Tg optical glasses available on the market, with more than a hundred types. However, LightPath has chosen to focus on a small number of moldable glass types to ensure the lowest cost while achieving the fastest delivery time for customers. Although these standard low-Tg optical glass options can already meet the needs of most customers, specific glasses may still be required for certain special applications. For these special needs, LightPath can provide corresponding glasses for precision molding and will first conduct material molding tests to ensure they are suitable for the precision molding process.

LightPath's innovatively developed Insert-Precision-Molding aspherical lens technology has revolutionarily integrated glass optical components with metal packaging structures into a single piece through molding, providing a highly reliable integrated solution for optical systems in harsh environments. By directly molding the aspherical lens into the inner cavity of the metal sleeve, the seamless integration of optical and mechanical structures is achieved, completely breaking through the physical limitations of traditional gluing processes.

## Product Advantages

- Direct molding. Utilizing advanced molding techniques, glass aspheric lenses are precisely molded within metal sleeves, creating a tight integration and a robust unit.
- The epoxy bonding step is completely eliminated. The lens's metal sleeve could be fixed within other metal through a high-temperature welding process, which significantly enhances the reliability and durability of the connection.

This lens design brings significant advantages to numerous optical applications, being particularly suitable for high-volume automated assembly scenarios. It can greatly improve assembly efficiency and reduce error rates. Meanwhile, due to its extremely high airtightness, it ensures the long-term stable operation of optical systems under harsh conditions. Thus, it is an ideal choice for aerospace, optical communication, high-end industrial optical instruments and other fields that have strict requirements for airtightness and reject the use of epoxy adhesives.



**Insert-Precision-Molding Aspherical Lens - Standard Product List**

| Lens Code | Focal Length | Numerical Aperture | Outer Diameter | Working Distance(mm) | Clear Aperture(mm) | Design Wavelength(nm) | Page |
|---|---|---|---|---|---|---|---|
| 355070 | 0.40 | 0.1/0.7 | 1.20 | 5.00/0.3 | 0.62/0.47 | 1550 | 9 |
| 355536 | 0.60 | 0.60 | 1.24 | 0.20 | 0.72/0.35 | 1310 | 10 |
| 355885 | 0.70 | 0.60 | 2.50 | 0.30 | 0.84/0.49 | 1550 | 10 |
| 355960 | 1.00 | 0.60 | 3.92 | 0.20 | 1.2/0.39 | 1550 | 10 |
| 355970 | 3.70 | 0.20 | 3.40 | 3.00 | 1.56/1.3 | 1550 | 14 |
| 355317 | 4.80 | 0.27 | 6.15 | 3.80 | 2.6/2.12 | 940 | 16 |

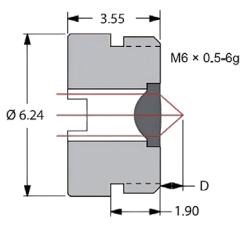
- Step curing and cementing process is adopted to permanently integrate the aspherical lens with the high-precision metal sleeve.
- Military-grade structural strength, featuring a high-strength stainless steel sleeve with external threads that support repeated disassembly and assembly.
- A wide range of standard aspheric lenses with mounts is available.
- Based on hundreds of LightPath standard aspherical lenses, customized development services can be provided to meet the needs of different customers.

**Mounted Aspherical lens - Standard Product List**

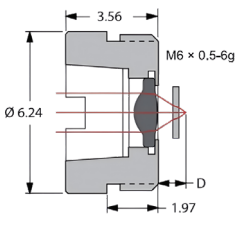
| Product Number | Lens holder number | Focal length (mm) | Numerical Aperture |
|---|---|---|---|
| 357775Y-00-MT | MT9 | 4.02 | 0.6 |
| 357765Y-00-MT | MT9 | 4.00 | 0.61 |
| 357610Y-00-MT | MT9 | 4.00 | 0.62 |
| 355397Y-00-MT | MT9 | 11.00 | 0.3 |
| 355375Y-00-MT | MT9 | 7.50 | 0.3 |
| 355330Y-00-MT | MT9 | 3.10 | 0.77 |
| 355230Y-00-MT | MT9 | 4.51 | 0.55 |
| 355110Y-00-MT | MT9 | 6.24 | 0.4 |
| 354850Y-00-MT | MT9 | 22.00 | 0.13 |
| 354560Y-00-MT | MT9 | 13.86 | 0.18 |
| 354453Y-00-MT | MT9 | 4.6 | 0.55 |
| 354340Y-00-MT | MT9 | 4.03 | 0.64 |
| 354306Y-00-MT | MT9 | 9.85 | 0.27 |
| 354280Y-00-MT | MT9 | 18.4 | 0.15 |
| 354260Y-00-MT | MT9 | 15.29 | 0.16 |
| 354220Y-00-MT | MT9 | 11.00 | 0.25 |
| 354105Y-00-MT | MT9 | 5.50 | 0.56 |
| 354064Y-00-MT | MT9 | 11.00 | 0.24 |
| 354062Y-00-MT | MT9 | 11.00 | 0.24 |
| 354061Y-00-MT | MT9 | 11.00 | 0.24 |
| 354060Y-00-MT | MT9 | 9.60 | 0.27 |
| 354059Y-00-MT | MT9 | 14.00 | 0.19 |
| 354058Y-00-MT | MT9 | 12.00 | 0.22 |
| 354057Y-00-MT | MT9 | 13.00 | 0.2 |
| 354525Y-00-MT | MT9 | 6.69 | 0.45 |
| 356300Y-00-MT | MT8 | 2.54 | 0.66 |
| 355660Y-00-MT | MT8 | 2.97 | 0.6 |
| 355440Y-00-MT | MT8 | 2.76 | 0.52 |
| 355392Y-00-MT | MT8 | 2.75 | 0.64 |
| 355390Y-00-MT | MT8 | 2.75 | 0.68 |
| 355160Y-00-MT | MT8 | 2.73 | 0.55 |
| 355022Y-00-MT | MT8 | 4.47 | 0.47 |
| 354350Y-00-MT | MT8 | 4.50 | 0.43 |
| 357786Y-00-MT | MT6B | 1.41 | 0.5 |
| 356785Y-00-MT | MT6B | 1.42 | 0.62 |
| 355200Y-00-MT | MT6B | 1.14 | 0.3 |
| 35515IY-00-MT | MT6B | 2.00 | 0.5 |
| 355150Y-00-MT | MT6B | 2.00 | 0.51 |
| 354996Y-00-MT | MT6B | 4.50 | 0.3 |
| 354710Y-00-MT | MT6B | 1.49 | 0.53 |
| 354550Y-00-MT | MT6B | 6.10 | 0.18 |
| 354430Y-00-MT | MT6B | 5.00 | 0.15 |
| 353515Y-00-MT | MT6B | 3.52 | 0.4 |
| 354140Y-00-MT | MT6A | 1.45 | 0.58 |
| 354115Y-00-MT | MT12 | 6.75 | 0.54 |
| 354240Y-00-MT | MT12 | 8.00 | 0.5 |

*The "Y" in the part number refers to the type of coating.

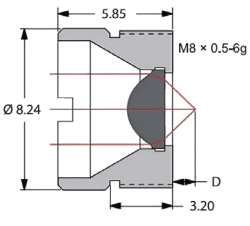
**Lens Holder MT6A**



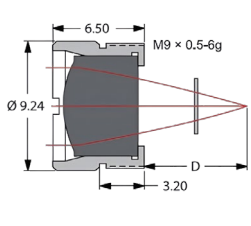

**Lens Holder MT6B**



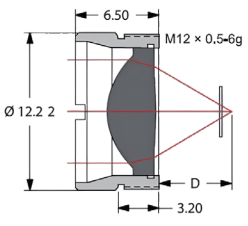

**Lens Holder MT8**




**Lens Holder MT9**




**Lens Holder MT12**

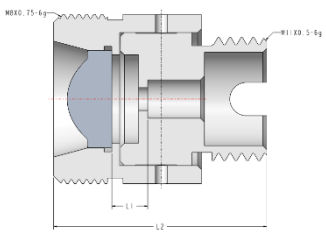


LightPath fiber collimators adopt an integrated design of high-precision aspherical lenses and standardized fiber interfaces, enabling rapid and accurate optical path docking through a threaded locking structure. The products are fully compatible with mainstream fiber interface types (including FC/PC, FC/APC, and SMA). The core optical components ensure the high collimation performance of the output beam through micron-level precision assembly technology. The entire series of products have passed wavelength-specific calibration tests and exhibit excellent optical performance within the wavelength range covered by the anti-reflective coating. Dozens of standard models are currently available, and full-process customization services are offered.
This series innovatively integrates the aspherical optical system into the standard fiber connector, supporting stable beam coupling and collimated output in the visible to near-infrared (NIR) wavelength range, and meeting diverse needs such as rapid integration of laser systems and optical path expansion.

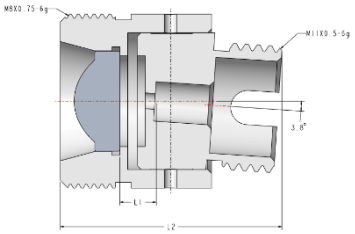
## Product Advantages

- Adopting an industrial-grade stainless steel main structure and an external thread locking interface, it supports rapid deployment of optical path systems and high-repeatability installation.
- It incorporates standard LightPath aspherical lenses, combined with Beam Scan for pre-adjustment and calibration, ensuring the precision and consistency of collimated beams.
- The innovative epoxy resin curing process guarantees the optical stability of the collimator within a wide temperature range from -40℃ to 85℃.
- The external thread design simplifies the installation process, enhancing installation convenience and flexibility.
- It boasts extensive compatibility with fiber optic connector types, including FC, APC, and SMA, catering to the requirements of diverse application scenarios.

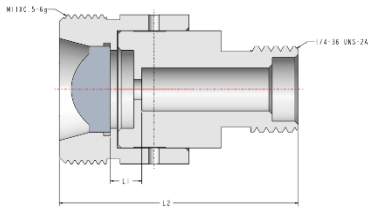
FC/PC Connectors



FC/APC Connectors



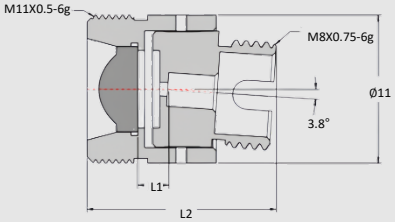
SMA Connectors



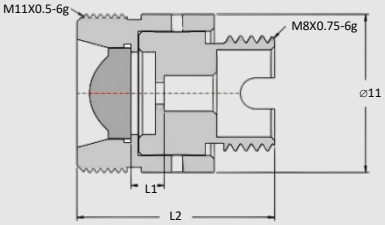
**Fiber Collimator - Standard Product List**

| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 357775-(FCAPC/FCPC)-405 | 357775 | 405 | 4.00 | 0.055 | 0.71 | UVA | 2.31 | 14.05 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 357775-SMA-405 | 357775 | 405 | 4.00 | 0.055 | 0.71 | UVA | 2.31 | 14.05 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |

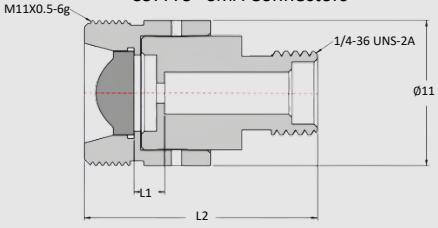
357775 - FC/APC Connectors




357775 - FC/PC Connectors



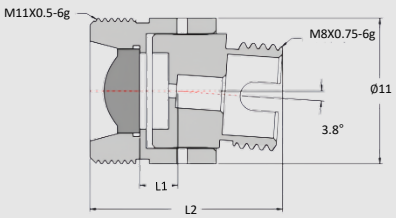

357775 - SMA Connectors



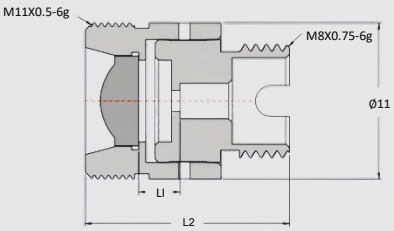
## Fiber Collimator - Standard Product List

| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 355230-(FCAPC/FCPC)-543 | 355230 | 543 | 4.41 | 0.045 | 0.87 | A | 2.91 | 14.63 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355230-(FCAPC/FCPC)-633 | 355230 | 633 | 4.46 | 0.046 | 1.00 | B | 2.96 | 14.68 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355230-(FCAPC/FCPC)-780 | 355230 | 780 | 4.51 | 0.064 | 0.90 | B | 2.99 | 14.71 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355230-(FCAPC/FCPC)-1064 | 355230 | 1064 | 4.56 | 0.078 | 1.00 | C | 3.04 | 14.76 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355230-(FCAPC/FCPC)-1310 | 355230 | 1310 | 4.59 | 0.114 | 0.83 | C | 3.07 | 14.79 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355230-(FCAPC/FCPC)-1550 | 355230 | 1550 | 4.61 | 0.129 | 0.88 | C | 3.09 | 14.81 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355230-SMA-543 | 355230 | 543 | 4.41 | 0.045 | 0.87 | A | 2.91 | 14.63 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355230-SMA-633 | 355230 | 633 | 4.46 | 0.046 | 1.00 | B | 2.96 | 14.68 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355230-SMA-780 | 355230 | 780 | 4.51 | 0.064 | 0.90 | B | 2.99 | 14.71 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355230-SMA-1064 | 355230 | 1064 | 4.56 | 0.078 | 1.00 | C | 3.04 | 14.76 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355230-SMA-1310 | 355230 | 1310 | 4.59 | 0.114 | 0.83 | C | 3.07 | 14.79 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355230-SMA-1550 | 355230 | 1550 | 4.61 | 0.129 | 0.88 | C | 3.09 | 14.81 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |

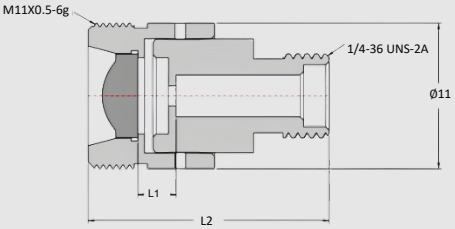
355230 - FC/APC Connectors




355230 - FC/PC Connectors

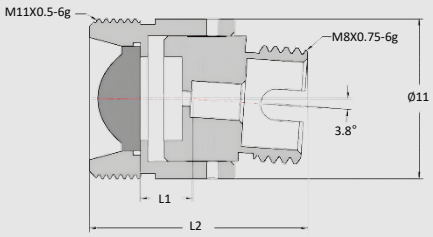



355230 - SMA Connectors




| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 354105-FCAPC-543 | 354105 | 543 | 5.46 | 0.037 | 1.08 | A | 3.61 | 15.07 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354105-FCAPC-633 | 354105 | 633 | 5.50 | 0.038 | 1.23 | B | 3.65 | 15.11 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354105-FCAPC-780 | 354105 | 780 | 5.54 | 0.052 | 1.10 | B | 3.68 | 15.14 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354105-FCAPC-1064 | 354105 | 1064 | 5.59 | 0.063 | 1.22 | C | 3.73 | 15.19 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354105-FCAPC-1310 | 354105 | 1310 | 5.63 | 0.094 | 1.02 | C | 3.76 | 15.22 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354105-FCAPC-1550 | 354105 | 1550 | 5.66 | 0.105 | 1.07 | C | 3.79 | 15.25 | (M11×0.5-6g)/(M8×0.75-6g) |

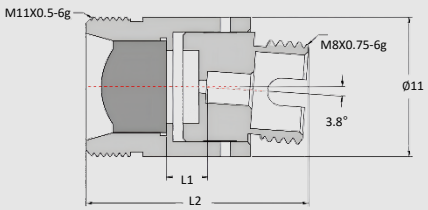
354105 - FC/APC Connectors



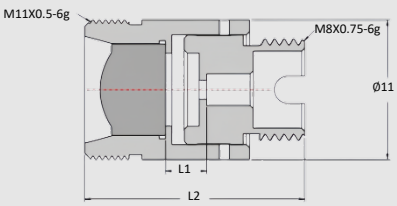
## Fiber Collimator - Standard Product List

| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 355110-(FCAPC/FCPC)-543 | 355110 | 543 | 6.10 | 0.033 | 1.21 | A | 3.25 | 17.58 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355110-(FCAPC/FCPC)-633 | 355110 | 633 | 6.17 | 0.033 | 1.38 | B | 3.30 | 17.63 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355110-(FCAPC/FCPC)-780 | 355110 | 780 | 6.24 | 0.046 | 1.24 | B | 3.36 | 17.69 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355110-(FCAPC/FCPC)-1064 | 355110 | 1064 | 6.31 | 0.056 | 1.38 | C | 3.42 | 17.75 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355110-(FCAPC/FCPC)-1310 | 355110 | 1310 | 6.35 | 0.083 | 1.15 | C | 3.45 | 17.78 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355110-(FCAPC/FCPC)-1550 | 355110 | 1550 | 6.38 | 0.093 | 1.21 | C | 3.48 | 17.81 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 355110-SMA-543 | 355110 | 543 | 6.10 | 0.033 | 1.21 | A | 3.25 | 21.21 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355110-SMA-633 | 355110 | 633 | 6.17 | 0.033 | 1.38 | B | 3.30 | 21.26 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355110-SMA-780 | 355110 | 780 | 6.24 | 0.046 | 1.24 | B | 3.36 | 21.32 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355110-SMA-1064 | 355110 | 1064 | 6.31 | 0.056 | 1.38 | C | 3.42 | 21.38 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355110-SMA-1310 | 355110 | 1310 | 6.35 | 0.083 | 1.15 | C | 3.45 | 21.41 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 355110-SMA-1550 | 355110 | 1550 | 6.38 | 0.093 | 1.21 | C | 3.48 | 21.44 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |

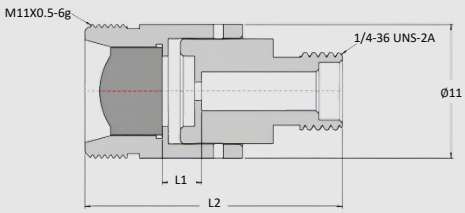
355110 - FC/APC Connectors




355110 - FC/PC Connectors




355110 - SMA Connectors

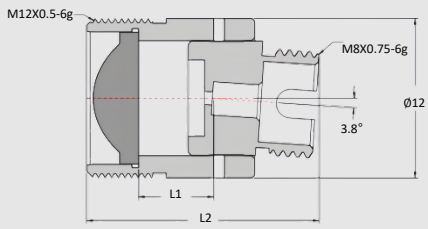



| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 354240-(FCAPC/FCPC)-543 | 354240 | 543 | 7.84 | 0.026 | 1.55 | A | 5.68 | 17.33 | (M12×0.5-6g)/(M8×0.75-6g) |
| 354240-(FCAPC/FCPC)-633 | 354240 | 633 | 7.90 | 0.026 | 1.77 | B | 5.74 | 17.39 | (M12×0.5-6g)/(M8×0.75-6g) |
| 354240-(FCAPC/FCPC)-780 | 354240 | 780 | 7.96 | 0.036 | 1.58 | B | 5.79 | 17.44 | (M12×0.5-6g)/(M8×0.75-6g) |
| 354240-(FCAPC/FCPC)-1064 | 354240 | 1064 | 8.04 | 0.044 | 1.80 | C | 5.86 | 17.51 | (M12×0.5-6g)/(M8×0.75-6g) |
| 354240-(FCAPC/FCPC)-1310 | 354240 | 1310 | 8.09 | 0.065 | 1.47 | C | 5.90 | 17.55 | (M12×0.5-6g)/(M8×0.75-6g) |
| 354240-(FCAPC/FCPC)-1550 | 354240 | 1550 | 8.13 | 0.073 | 1.54 | C | 5.95 | 17.6 | (M12×0.5-6g)/(M8×0.75-6g) |
| 354240-SMA-543 | 354240 | 543 | 7.84 | 0.026 | 1.55 | A | 5.68 | 21.19 | (M12 x 0.5-6g)/(1/4-36 UNS-2A) |
| 354240-SMA-633 | 354240 | 633 | 7.90 | 0.026 | 1.77 | B | 5.74 | 21.25 | (M12 x 0.5-6g)/(1/4-36 UNS-2A) |
| 354240-SMA-780 | 354240 | 780 | 7.96 | 0.036 | 1.58 | B | 5.79 | 21.3 | (M12 x 0.5-6g)/(1/4-36 UNS-2A) |
| 354240-SMA-1064 | 354240 | 1064 | 8.04 | 0.044 | 1.80 | C | 5.86 | 21.37 | (M12 x 0.5-6g)/(1/4-36 UNS-2A) |

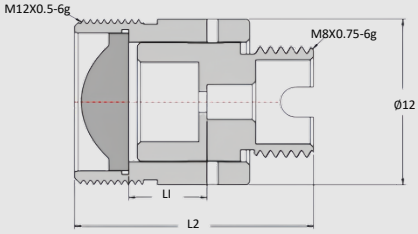
## Fiber Collimator - Standard Product List

| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 354240-SMA-1310 | 354240 | 1310 | 8.09 | 0.065 | 1.47 | C | 5.90 | 21.41 | (M12 x 0.5-6g)/(1/4-36 UNS-2A) |
| 354240-SMA-1550 | 354240 | 1550 | 8.13 | 0.073 | 1.54 | C | 5.95 | 21.46 | (M12 x 0.5-6g)/(1/4-36 UNS-2A) |

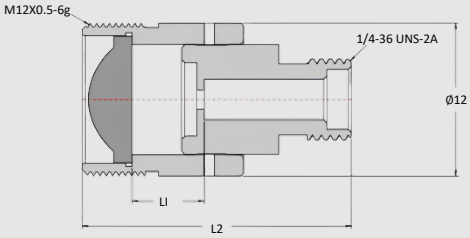
354240 - FC/APC Connectors




354240 - FC/PC Connectors

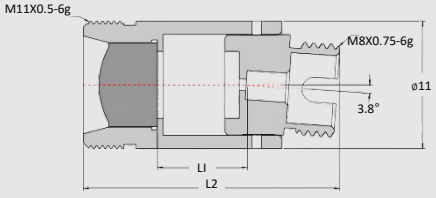



354240 - SMA Connectors

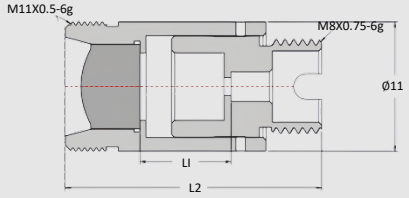



| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 354220-(FCAPC/FCPC)-543 | 354220 | 543 | 10.92 | 0.018 | 2.16 | A | 7.75 | 21.85 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354220-(FCAPC/FCPC)-543 | 354220 | 543 | 10.92 | 0.018 | 2.16 | A | 7.75 | 21.85 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354220-(FCAPC/FCPC)-633 | 354220 | 633 | 11.00 | 0.019 | 2.46 | B | 7.82 | 21.92 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354220-(FCAPC/FCPC)-780 | 354220 | 780 | 11.09 | 0.026 | 2.20 | B | 7.90 | 22 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354220-(FCAPC/FCPC)-1064 | 354220 | 1064 | 11.19 | 0.032 | 2.44 | C | 7.99 | 22.09 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354220-(FCAPC/FCPC)-1310 | 354220 | 1310 | 11.26 | 0.047 | 2.04 | C | 8.05 | 22.15 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354220-(FCAPC/FCPC)-1550 | 354220 | 1550 | 11.32 | 0.053 | 2.15 | C | 8.11 | 22.21 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354220-SMA-543 | 354220 | 543 | 10.92 | 0.018 | 2.16 | A | 7.75 | 25.71 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354220-SMA-633 | 354220 | 633 | 11.00 | 0.019 | 2.46 | B | 7.82 | 25.78 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354220-SMA-780 | 354220 | 780 | 11.09 | 0.026 | 2.20 | B | 7.90 | 25.86 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354220-SMA-1064 | 354220 | 1064 | 11.19 | 0.032 | 2.44 | C | 7.99 | 25.95 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354220-SMA-1310 | 354220 | 1310 | 11.26 | 0.047 | 2.04 | C | 8.05 | 26.01 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354220-SMA-1550 | 354220 | 1550 | 11.32 | 0.053 | 2.15 | C | 8.11 | 26.07 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |

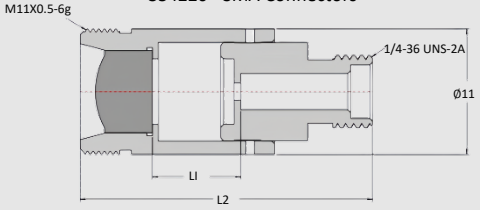
354220 - FC/APC Connectors




354220 - FC/PC Connectors



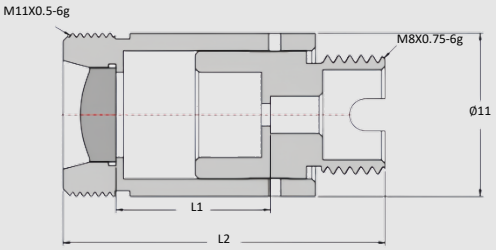

354220 - SMA Connectors



## Fiber Collimator - Standard Product List

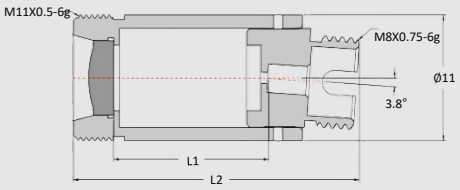
| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 354058-FCPC-543 | 354085 | 543 | 11.91 | 0.017 | 2.35 | A | 10.40 | 21.69 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354058-FCPC-633 | 354085 | 633 | 12.00 | 0.017 | 2.69 | B | 10.49 | 21.78 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354058-FCPC-780 | 354085 | 780 | 12.10 | 0.024 | 2.40 | B | 10.58 | 21.87 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354058-FCPC-1064 | 354085 | 1064 | 12.21 | 0.029 | 2.67 | C | 10.68 | 21.97 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354058-FCPC-1310 | 354085 | 1310 | 12.28 | 0.043 | 2.23 | C | 10.75 | 22.04 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354058-FCPC-1550 | 354085 | 1550 | 12.35 | 0.048 | 2.34 | C | 10.82 | 22.11 | (M11×0.5-6g)/(M8×0.75-6g) |

354058 - FC/PC Connectors

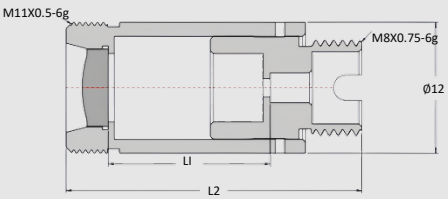



| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 354260-(FCAPC/FCPC)-543 | 354260 | 543 | 15.05 | 0.013 | 2.97 | A | 13.66 | 25.18 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 354260-(FCAPC/FCPC)-633 | 354260 | 633 | 15.17 | 0.014 | 3.40 | B | 13.78 | 25.3 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 354260-(FCAPC/FCPC)-780 | 354260 | 780 | 15.29 | 0.019 | 3.04 | B | 13.89 | 25.41 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 354260-(FCAPC/FCPC)-1064 | 354260 | 1064 | 15.43 | 0.023 | 3.37 | C | 14.03 | 25.55 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 354260-(FCAPC/FCPC)-1310 | 354260 | 1310 | 15.52 | 0.034 | 2.81 | C | 14.12 | 25.64 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 354260-(FCAPC/FCPC)-1550 | 354260 | 1550 | 15.61 | 0.038 | 2.96 | C | 14.21 | 25.73 | (M11X0.5-6g )/(M8X0.75-6g ) |
| 354260-SMA-543 | 354260 | 543 | 15.05 | 0.013 | 2.97 | A | 13.66 | 28.81 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354260-SMA-633 | 354260 | 633 | 15.17 | 0.014 | 3.40 | B | 13.78 | 28.93 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354260-SMA-780 | 354260 | 780 | 15.29 | 0.019 | 3.04 | B | 13.89 | 29.04 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354260-SMA-1064 | 354260 | 1064 | 15.43 | 0.023 | 3.37 | C | 14.03 | 29.18 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354260-SMA-1310 | 354260 | 1310 | 15.52 | 0.034 | 2.81 | C | 14.12 | 29.27 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |
| 354260-SMA-1550 | 354260 | 1550 | 15.61 | 0.038 | 2.96 | C | 14.21 | 29.36 | (M11X0.5-6g )/(1/4-36 UNS-2A ) |

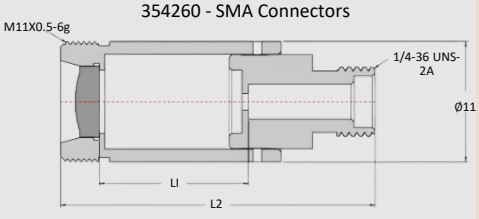
354260 - FC/APC Connectors




354260 - FC/PC Connectors



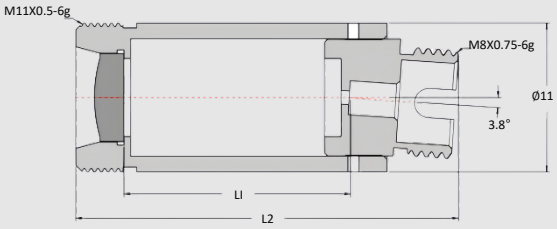

354260 - SMA Connectors



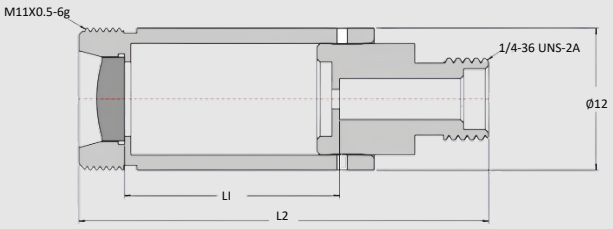
## Fiber Collimator - Standard Product List

| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 354280-FCAPC-543 | 354280 | 543 | 18.11 | 0.011 | 3.58 | A | 16.74 | 28.26 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354280-FCAPC-633 | 354280 | 633 | 18.26 | 0.011 | 4.09 | B | 16.88 | 28.4 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354280-FCAPC-780 | 354280 | 780 | 18.40 | 0.016 | 3.65 | B | 17.02 | 28.54 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354280-FCAPC-1064 | 354280 | 1064 | 18.57 | 0.019 | 4.06 | C | 17.18 | 28.7 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354280-FCAPC-1310 | 354280 | 1310 | 18.68 | 0.028 | 3.39 | C | 17.30 | 28.82 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354280-FCAPC-1550 | 354280 | 1550 | 18.79 | 0.032 | 3.57 | C | 17.40 | 28.92 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354280-SMA-543 | 354280 | 543 | 18.11 | 0.011 | 3.58 | A | 16.74 | 31.89 | (M11×0.5-6g)/(1/4-36 UNS-2A) |
| 354280-SMA-633 | 354280 | 633 | 18.26 | 0.011 | 4.09 | B | 16.88 | 32.03 | (M11×0.5-6g)/(1/4-36 UNS-2A) |
| 354280-SMA-780 | 354280 | 780 | 18.40 | 0.016 | 3.65 | B | 17.02 | 32.17 | (M11×0.5-6g)/(1/4-36 UNS-2A) |
| 354280-SMA-1064 | 354280 | 1064 | 18.57 | 0.019 | 4.06 | C | 17.18 | 32.33 | (M11×0.5-6g)/(1/4-36 UNS-2A) |
| 354280-SMA-1310 | 354280 | 1310 | 18.68 | 0.028 | 3.39 | C | 17.30 | 32.45 | (M11×0.5-6g)/(1/4-36 UNS-2A) |
| 354280-SMA-1550 | 354280 | 1550 | 18.79 | 0.032 | 3.57 | C | 17.40 | 32.55 | (M11×0.5-6g)/(1/4-36 UNS-2A) |

354280 - FC/APC Connectors



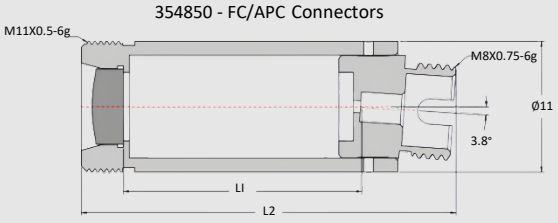

354280 - SMA Connectors



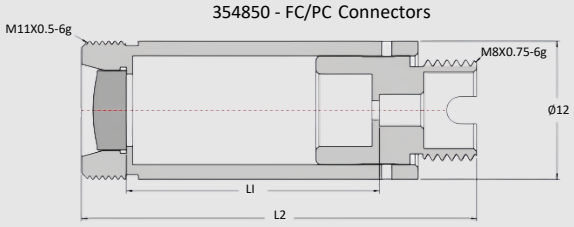

**Fiber Collimator - Standard Product List**

| Fiber Optic Collimator Model | Lens Code | Wavelength (nm) | Focal Length (mm) | Divergence Angle (+0.01 / -0.00°) | Beam Φ(mm) | AR Coating | Working Distance L1(mm) | Total Length (±0.25mm) | Thread Φ (Lens End / Fiber End) |
|---|---|---|---|---|---|---|---|---|---|
| 354850-(FCAPC/FCPC)-543 | 354850 | 543 | 21.78 | 4.302 | 5.60 | A | 20.11 | 31.4 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354850-(FCAPC/FCPC)-633 | 354850 | 633 | 21.95 | 0.009 | 4.91 | B | 20.27 | 31.56 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354850-(FCAPC/FCPC)-780 | 354850 | 780 | 22.12 | 0.013 | 4.39 | B | 20.44 | 31.73 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354850-(FCAPC/FCPC)-1064 | 354850 | 1064 | 22.32 | 0.016 | 4.88 | C | 20.64 | 31.93 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354850-(FCAPC/FCPC)-1310 | 354850 | 1310 | 22.46 | 0.023 | 4.07 | C | 20.77 | 32.06 | (M11×0.5-6g)/(M8×0.75-6g) |
| 354850-(FCAPC/FCPC)-1550 | 354850 | 1550 | 22.59 | 0.026 | 4.29 | C | 20.90 | 32.19 | (M11×0.5-6g)/(M8×0.75-6g) |

354850 - FC/APC Connectors




354850 - FC/PC Connectors




## Custom Fiber Collimators

Most standard aspheric lenses in our catalog can be custom-designed into fiber optic collimators according to your requirements. For more information, please contact LightPath's sales representatives.

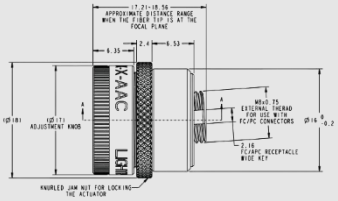
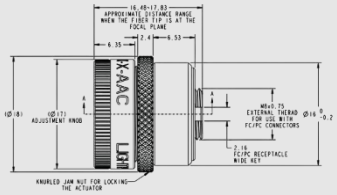
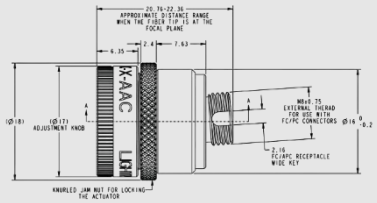
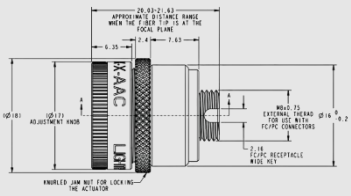
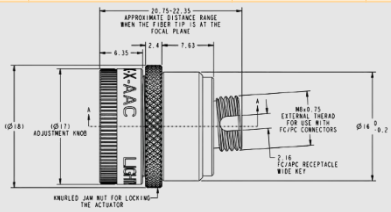
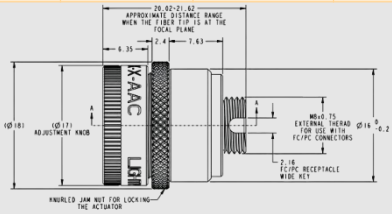
For customization needs, please contact our sales representatives!

# VIS-NIR Adjustable-Focus Fiber Collimator

LightPath's adjustable-focus fiber collimator is a major innovation in fiber optics. It integrates precision aspheric lenses, advanced coating technology, and sophisticated mechanical design to ensure excellent optical performance. Featuring unique flexibility, its focal length can be finely adjusted to meet precise focusing needs across applications. Via a simple rotation mechanism, users can easily adjust the lens-fiber endface distance for rapid beam collimation. Additionally, its mechanical fixing design enables stable performance in varying environments, ensuring long-term reliability.

This collimator supports multiple fiber connectors(e.g., FC/PC, FC/APC)for seamless integration with existing systems. Its modular design allows easy integration into various optical systems, offering great user convenience. To meet customers' specific technical requirements, LightPath provides customization services(e.g., custom dimensions, designed wavelengths, output beam diameters). This flexibility helps the product adapt to diverse market needs and deliver personalized solutions.

**Adjustable-Focus Fiber Collimator**

| Product Model | Focal Length (mm) (Adjustable) | Numerical Aperture | Clear Aperture | Interface Type | Outer Diameter (mm) | Length(mm) | Metal Bracket Material |
|---|---|---|---|---|---|---|---|
| 355230-FCPC-X-AAC | 4.18-4.61 | 0.59-0.54 | 5.07 | FC/PC | 17 | 16.5-16.91 | SUS304 |
| 355230-FCAPC-X-AAC | 4.18-4.61 | 0.59-0.54 | 5.07 | FC/APC | 17 | 17.21-18.56 | SUS304 |
|  | | | |  | | | |
| 355375-FCPC-X-AAC | 6.96-7.67 | 0.32-0.29 | 4.54 | FC/PC | 17 | 20.03-21.63 | SUS304 |
| 355375-FCAPC-X-AAC | 6.96-7.67 | 0.32-0.29 | 4.54 | FC/PC | 17 | 20.76-22.36 | SUS304 |
|  | | | |  | | | |
| 354220-FCPC-X-AAC | 10.56-11.37 | 0.26-0.24 | 5.50 | FC/PC | 17 | 20.02-21.62 | SUS304 |
| 354220-FCAPC-X-AAC | 10.56-11.37 | 0.26-0.24 | 5.50 | FC/APC | 17 | 20.75-22.35 | SUS304 |
|  | | | |  | | | |

## Application Fields

- **Fiber Optic Sensing**
- **Laser Systems For Medical Applications**
- **Optical Measurement And Testing Equipment**
- **Free-Space Optical Communication Systems**
- **Optical Experiments And Research**
- **Industrial Automation**

## High-Performance Aspherical Lenses for MWIR-LWIR Laser

LightPath's infrared aspherical collimating lenses utilize the exclusive BD2 infrared chalcogenide glass, enabling ultra-broad spectral transmission of 2-14 µm. They are suitable for quantum cascade lasers(QCL), medical lasers, gas analysis instruments, as well as the collimation and coupling of mid-infrared and far-infrared lasers.

## Product Advantages

- A variety of standard infrared aspherical collimating lenses are available, allowing customers to select the most suitable one based on their needs.
- The high numerical aperture (NA) design effectively enhances the efficiency of light energy collection.
- The single-piece aspherical lensdesign enables performance that is nearly diffraction-limited.
- The products comply with RoHS certification and can meet the strict safety standards in fields such as medical and industrial equipment.

## Advanced Manufacturing Processes

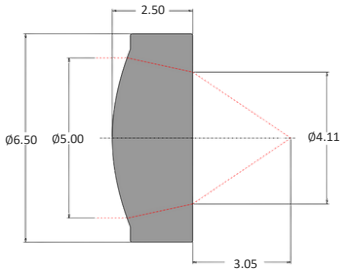
- From chalcogenide glass materials, to precision molding of aspheric lenses, and then to infrared coating, the entire vertical integration of production is achieved.
- Mounted Infrared collimating lenses can be provided. The lenses are precisely cemented and assembled with metal sleeve holders to enhance lens stability.
- The Insert-Precesion-Molding process can be adopted to directly mold the lens into the metal sleeve, which effectively reduces the optical axis deviation and lowers the risk of epoxy resin aging. Optional metal materials include various types such as SS304L, SS316 (corrosion-resistant), AL6061 (lightweight), and Inconel718 (high-temperature resistant).

**Standard MWIR-LWIR Aspherical Lens**

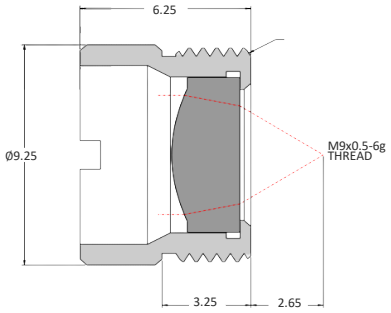
| Lens Code | Design Wavelength(nm) | Numerical Aperture | Clear Aperture (mm) | Effective Focal length(mm) | Outer Diameter (mm) | Working Distance (mm) | Center Thickness (mm) |
|---|---|---|---|---|---|---|---|
| 390029 | 4200 | 0.86 | 2.5/2.17 | 0.91 | 3.0 | 0.66 | 0.90 |
| 390010 | 9200 | 0.83 | 3.0/1.85 | 1.47 | 4.5 | 0.63 | 2.18 |
| 390017 | 2300 | 0.72 | 2.60/2.16 | 1.50 | 3.5 | 1.24 | 1.10 |
| 390037 | 9500 | 0.85 | 4.0/2.5 | 1.87 | 5.5 | 0.72 | 3.00 |
| 390093 | 7800 | 0.71 | 5.0/3.87 | 3.0 | 6.5 | 2.35 | 2.62 |
| 390036 | 2550 | 0.56 | 5.0/4.11 | 4.0 | 6.5 | 3.05 | 2.50 |
| 390028 | 4100 | 0.56 | 7.56/6.78 | 5.95 | 8.0 | 5.0 | 2.50 |
| 390042 | 2534 | 0.23 | 10.0/10.0 | 19.04 | 12.5 | 16.33 | 5.00 |
| 390121 | 3500 | 0.18 | 4.0/3.59 | 11.0 | 6.5 | 9.83 | 3.06 |

**The above-mentioned infrared collimating aspheric lenses are available in an assembly version with a holder, designated as Model 39xxxx-MT.

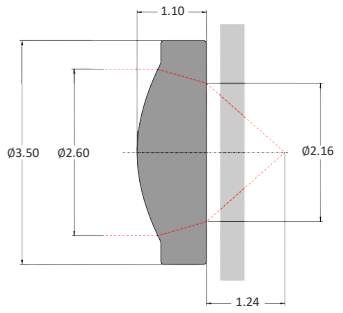
# MWIR-LWIR Aspherical Lens - Performance and Parameters



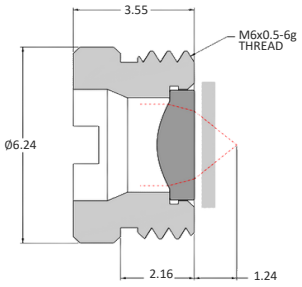

| 390036 | |
|---|---|
| Design wavelength | 2550nm |
| Focal length | 4.0mm |
| Numerical Aperture | 0.56 |
| Clear Aperture | 5.0/4.11 |



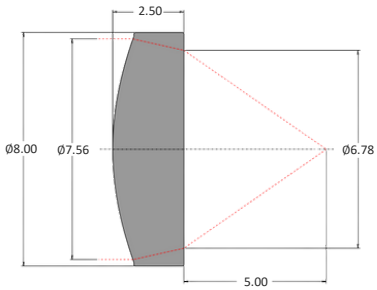

| 390036MT | |
|---|---|
| Design wavelength | 2550nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.56 |
| Clear Aperture | 5.0/4.11 |



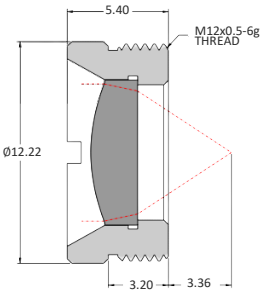

| 390017 | |
|---|---|
| Design wavelength | 2300nm |
| Focal length | 1.50mm |
| Numerical Aperture | 0.72 |
| Clear Aperture | 2.60/2.16 |



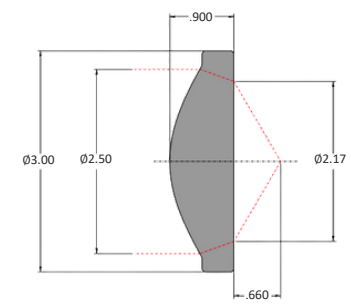

| 390017MT | |
|---|---|
| Design wavelength | 2300nm |
| Focal length | 1.50mm |
| Numerical Aperture | 0.72 |
| Clear Aperture | 2.60/2.16 |



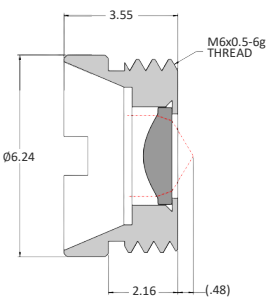

| 390028 | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 15.30mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.00/4.8 |



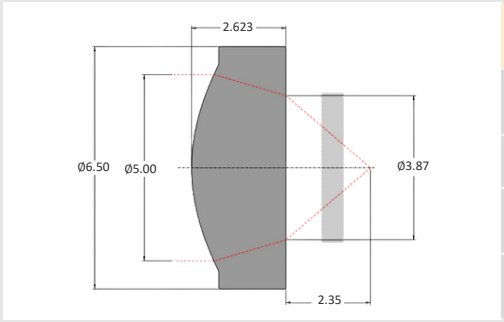

| 390028MT | |
|---|---|
| Design wavelength | 4100nm |
| Focal length | 25.00mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 13.03/12.28 |



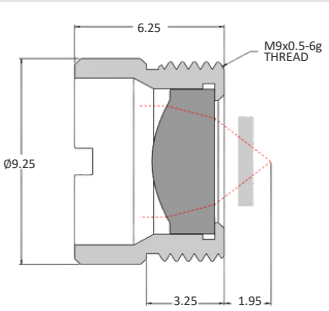

| 390029 | |
|---|---|
| Design wavelength | 4200nm |
| Focal length | 0.91mm |
| Numerical Aperture | 0.86 |
| Clear Aperture | 2.5/2.17 |



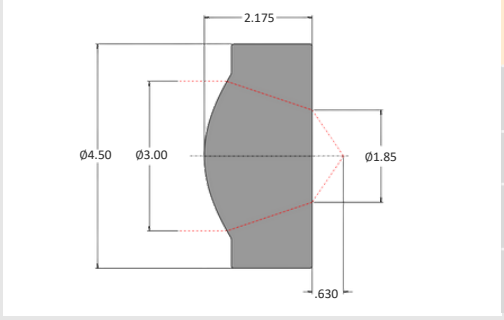

| 390029MT | |
|---|---|
| Design wavelength | 4200nm |
| Focal length | 0.91mm |
| Numerical Aperture | 0.86 |
| Clear Aperture | 2.5/2.17 |



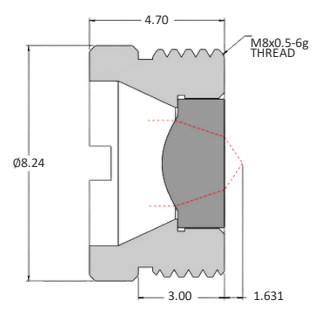

| 390036 | |
|---|---|
| Design wavelength | 2550nm |
| Focal length | 4.0mm |
| Numerical Aperture | 0.56 |
| Clear Aperture | 5.0/4.11 |



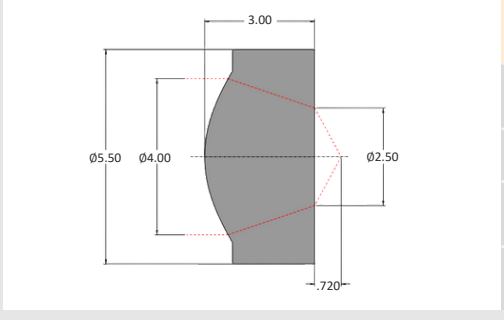

| 390036MT | |
|---|---|
| Design wavelength | 2550nm |
| Focal length | 4.00mm |
| Numerical Aperture | 0.56 |
| Clear Aperture | 5.0/4.11 |



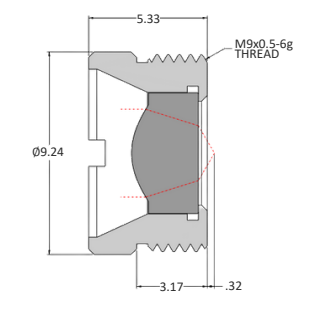

| 390017 | |
|---|---|
| Design wavelength | 2300nm |
| Focal length | 1.50mm |
| Numerical Aperture | 0.72 |
| Clear Aperture | 2.60/2.16 |



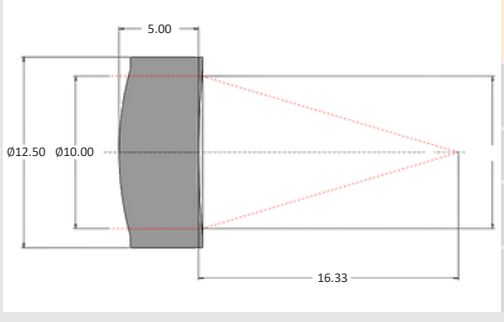

| 390017MT | |
|---|---|
| Design wavelength | 2300nm |
| Focal length | 1.50mm |
| Numerical Aperture | 0.72 |
| Clear Aperture | 2.60/2.16 |



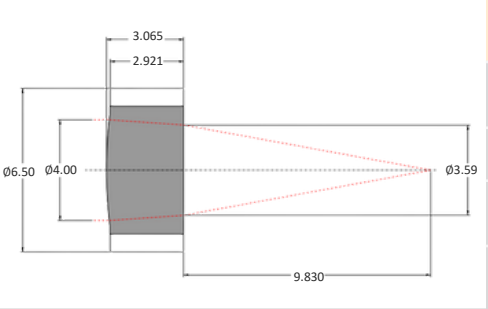

| 390028 | |
|---|---|
| Design wavelength | 780nm |
| Focal length | 15.30mm |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.00/4.8 |




| 390028MT | |
|---|---|
| Design wavelength | 4100nm |
| Focal length | 25.00mm |
| Numerical Aperture | 0.30 |
| Clear Aperture | 13.03/12.28 |




| 390029 | |
|---|---|
| Design wavelength | 4200nm |
| Focal length | 0.91mm |
| Numerical Aperture | 0.86 |
| Clear Aperture | 2.5/2.17 |




| 390029MT | |
|---|---|
| Design wavelength | 4200nm |
| Focal length | 0.91mm |
| Numerical Aperture | 0.86 |
| Clear Aperture | 2.5/2.17 |

# Thermal Imaging Lens Assembly

LightPath's thermal imaging lenses integrate LightPath's advanced optical design, chalcogenide glass manufacturing technology, precision molding technology, infrared coating technology, and are assembled into easy-to-use lens assemblies. Among these, infrared molded aspheric lenses, due to their low cost in batch production, have become an ideal alternative to lenses produced by traditional diamond turning processes.

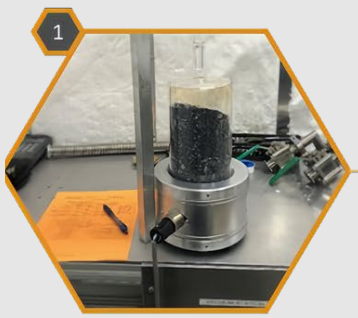
To meet customers' specific application requirements, LightPath offers customized lens design services. Its team of experienced engineers will utilize professional expertise to create tailor-made optical solutions for customers. The services cover complex imaging design, thermal analysis and athermalization design, ensuring that products operate stably with excellent performance even under significant temperature differences.

## Product Advantages

- Lenses are made from LightPath's high-quality Black Diamond™ infrared chalcogenide glass, ensuring excellent optical performance.
- The athermalization design offers a wide operating range, adapting to extreme temperature environments from -40°C to +80°C.
- Precision Glass Molding (PGM) technology enables large-scale production while maintaining strict tolerances, ensuring stable product quality.
- The diffractive rings for correcting chromatic aberration can be integrated with aspheric lenses through a single molding process, eliminating the need for subsequent single-point diamond turning.
- An efficient anti-reflection (AR) coating is used across the full infrared wavelength range (8–14µm). The outermost lens can be optionally coated with HD or DLC coating to enhance the scratch resistance and durability of the lens.
- Global manufacturing capabilities, a vertically integrated production model, and a world-class team of engineers provide a solid foundation for the R&D and production of products.

## Full Vertical Integration In Infrared Lens Production

**Chalcogenide Raw Materials**




**Chalcogenide Glass Ingot Production**


**Chalcogenide Glass Preform Processing**



**Infrared Lens Molding**


**Coatings (AR HD, DLC)**


**Infrared Lens Assembly**

## Applications And Functions

LightPath's thermal imaging lenses have a wide range of applications:

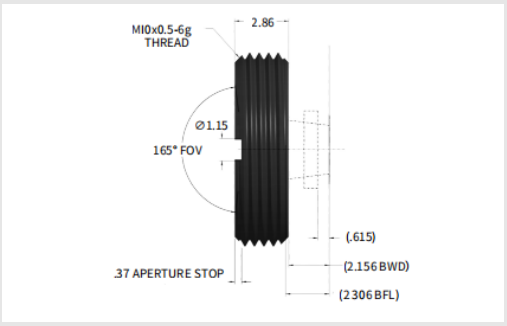
- Thermal Imaging and Thermal Infrared Imaging
- Gas Sensing and Spectroscopy
- Security and Surveillance
- Automotive Vision Enhancement
- Manufacturing Process Control and Inspection
- Target Tracking and Recognition
- Weapon Sights
- Thermal Imaging Monoculars and Binoculars

To meet customers' specific application requirements, LightPath provides design and manufacturing services for customized infrared lenses. Its team of experienced engineers will leverage professional expertise to create tailor-made optical solutions for customers. The services cover complex imaging design, as well as thermal analysis and athermalization design, ensuring that products operate stably with excellent performance even under significant temperature differences.

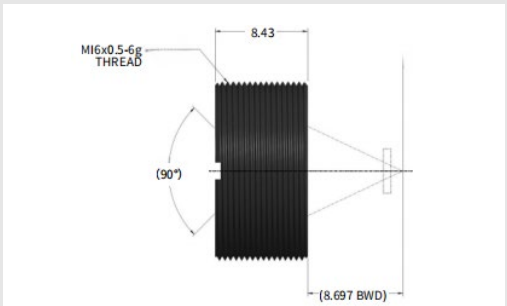
**Standard Infrared Thermal Imaging Lens Models**

| Product Code | Lens Type | Effective Focal Length | F/# | Recommended Detector Specifications (HxVResolution / Pixel Size) | Horizontal Field of View (for Specific Detectors) |
|---|---|---|---|---|---|
| 7100333 | Molded BD6 ™ Singlet | 1.5 mm | 1.3 | 80 x 80 / 34 µm | 120° |
| 7100327 | Molded BD6 ™ Singlet | 1.9 mm | 1.3 | 80 x 80 / 34 µm | 90° |
| 7100380 | Molded BD6 ™ Singlet | 2.7 mm | 1.3 | 80 x 80 / 34 µm | 60° |
| 7100410 | Molded BD6 ™ Singlet | 4.0 mm | 1.2 | 320 x 240 / 12 µm | 56° |
| 7100331 | Molded BD6 ™ Singlet | 5.3 mm | 1.3 | 320 x 240 /12 µm | 42° |
| 7100306 | Molded BD6 ™ Singlet | 6.3 mm | 1.3 | 320 x 240 / 17 µm | 50° |
| 7100305 | Molded BD6 ™ Singlet | 7.7 mm | 1.3 | 320x240 / 17 µm | 41° |
| 7100320 | Molded BD6 ™ Singlet | 9 mm | 1.3 | 320 x240 / 17 µm | 35° |
| 7100340 | Molded BD6 ™ Singlet | 15 mm | 1.2 | 640x512 / 10 µm | 25° |
| 7100350 | Molded BD6 ™ Singlet | 15 mm | 1.0 | 384 x 288 / 17 µm | 25° |
| 7100338 | Molded BD6 ™ Singlet | 19 mm | 1.1 | 640 x 480 / 17 µm | 32° |
| 7100341 | Molded BD6 ™ Singlet | 20 mm | 1.2 | 640x512 / 10 µm | 18° |
| 7100346 | DT / Molded BD6 ™ Doublet | 24 mm | 1.2 | 640x480 / 17 µm | 26° |
| 7100412 | DT / Molded BD6 ™ Doublet | 25 mm | 1.0 | 640x480 /17 µm | 25° |
| 7100383 | DT / Molded BD6 ™ Doublet | 35 mm | 1.0 | 640 x480 / 17 µm | 18° |
| 7100353 | DT / Molded BD6™ Doublet | 50 mm | 1.2 | 640x480 / 17 µm | 12° |
| 7100406 | DT Germanium Doublet | 75 mm | 1.0 | 640x480 / 17 µm | 8° |

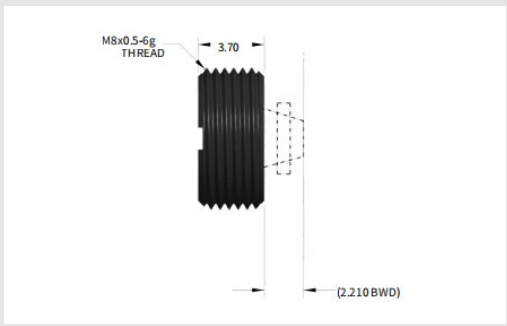
For customization needs, please contact our sales team!



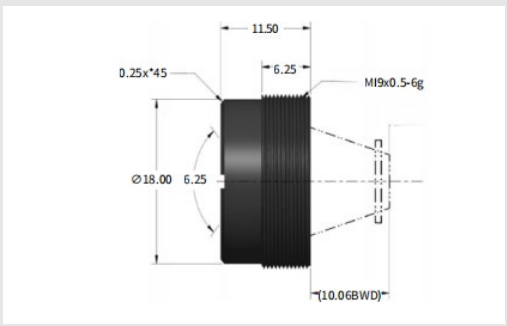

| 7100333 | |
|---|---|
| EFL | 1.5 |
| F/# | 1.3 |
| Resolution | 80*80/34 |
| HFOV | 120 |



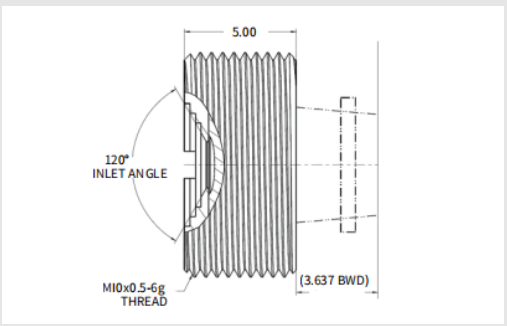

| 7100306 | |
|---|---|
| EFL | 6.3 |
| F/# | 1.3 |
| Resolution | 320*240/17 |
| HFOV | 50 |



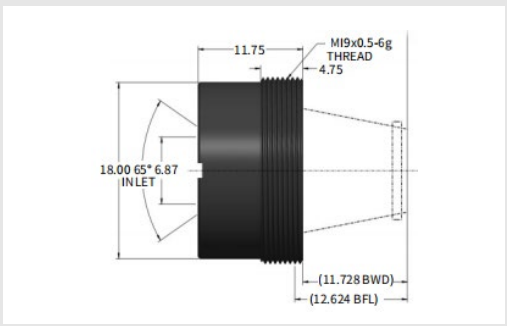

| 7100327 | |
|---|---|
| EFL | 1.9 |
| F/# | 1.3 |
| Resolution | 80*80/34 |
| HFOV | 90 |



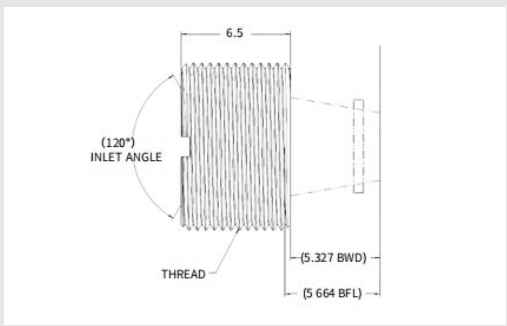

| 7100305 | |
|---|---|
| EFL | 7.7 |
| F/# | 1.3 |
| Resolution | 320*240/17 |
| HFOV | 41 |



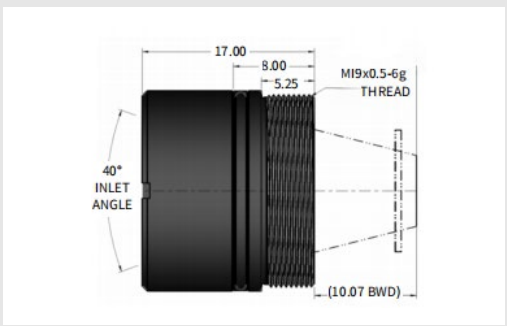

| 7100380 | |
|---|---|
| EFL | 2.7 |
| F/# | 1.3 |
| Resolution | 80*80/34 |
| HFOV | 60 |



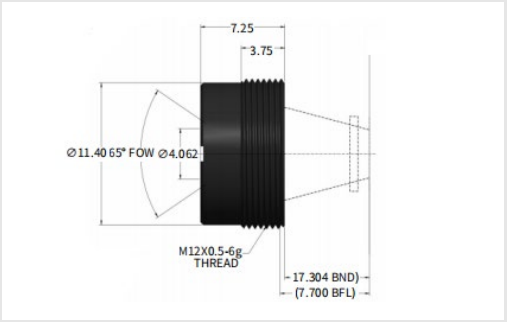

| 7100320 | |
|---|---|
| EFL | 9 |
| F/# | 1.3 |
| Resolution | 320*240/17 |
| HFOV | 35 |



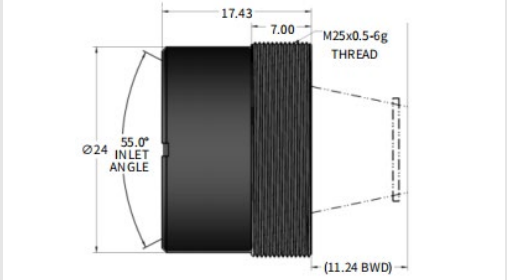

| 7100410 | |
|---|---|
| EFL | 4.0 |
| F/# | 1.2 |
| Resolution | 320*240/12 |
| HFOV | 56 |



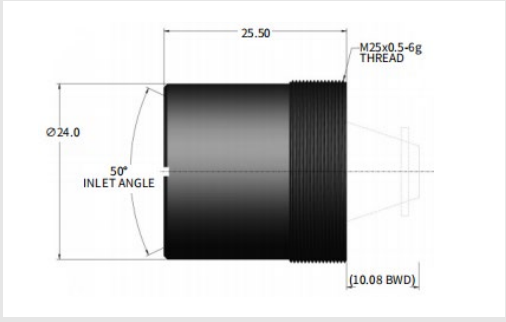

| 7100340 | |
|---|---|
| EFL | 15 |
| F/# | 1.2 |
| Resolution | 640*512/10 |
| HFOV | 25 |



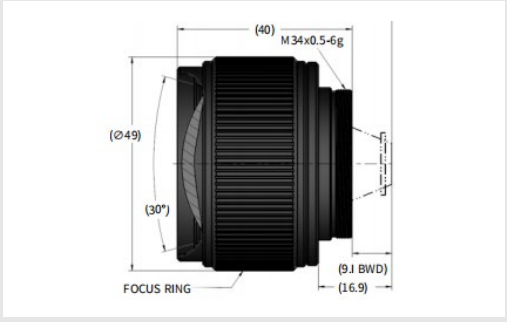

| 7100331 | |
|---|---|
| EFL | 5.3 |
| F/# | 1.3 |
| Resolution | 320*240/12 |
| HFOV | 42 |



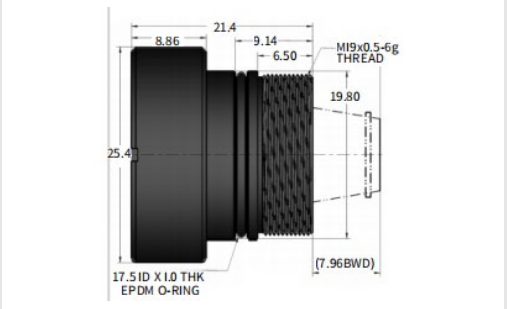

| 7100350 | |
|---|---|
| EFL | 15 |
| F/# | 1.0 |
| Resolution | 384*288/17 |
| HFOV | 25 |



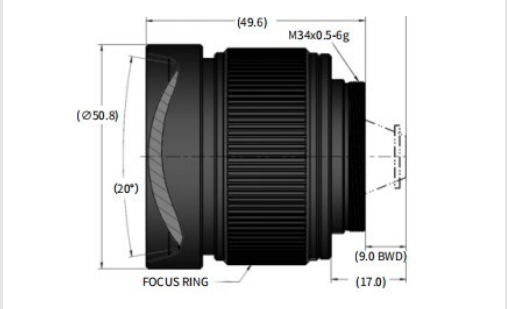

| 7100327 | |
|---|---|
| EFL | 1.9 |
| F/# | 1.3 |
| Resolution | 80*80/34 |
| HFOV | 90 |



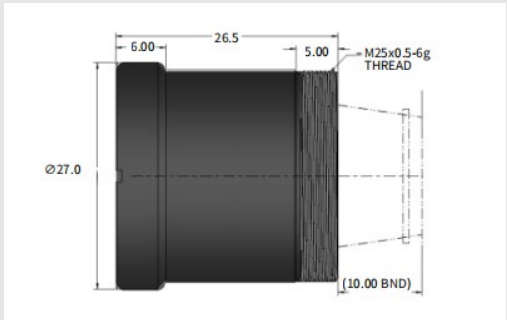

| 7100305 | |
|---|---|
| EFL | 7.7 |
| F/# | 1.3 |
| Resolution | 320*240/17 |
| HFOV | 41 |




| 7100380 | |
|---|---|
| EFL | 2.7 |
| F/# | 1.3 |
| Resolution | 80*80/34 |
| HFOV | 60 |




| 7100320 | |
|---|---|
| EFL | 9 |
| F/# | 1.3 |
| Resolution | 320*240/17 |
| HFOV | 35 |



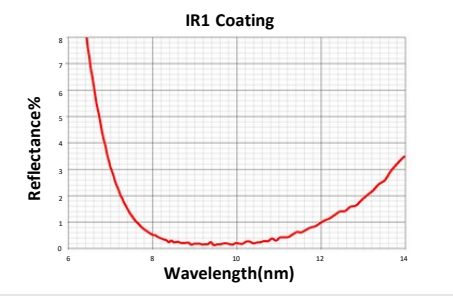

| 7100410 | |
|---|---|
| EFL | 4.0 |
| F/# | 1.2 |
| Resolution | 320*240/12 |
| HFOV | 56 |

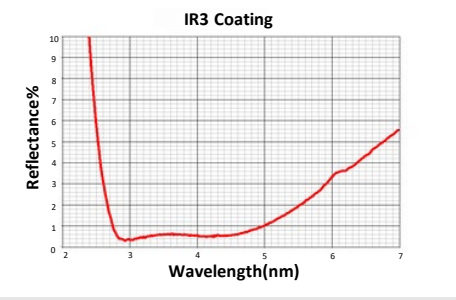
# Standard MWIR-LWIR Coatings

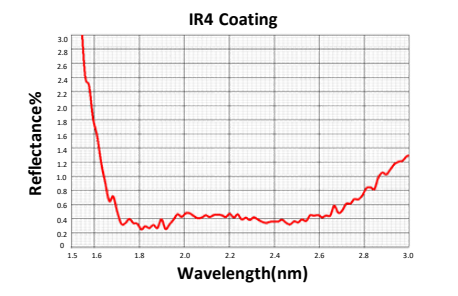
| Standard MWIR-LWIR Coating | | | | |
|---|---|---|---|---|
| Infrared Coating Code | Coating Type (Lens 1st Surface / 2nd Surface) | Wavelength Range (μm) | Optical Specifications | Infrared Glass Material |
| IR - 1 | AR / AR | 8 - 12 | AR 8μm - 12μm Ave R% < 0.6% | BD2 |
| IR - 2 | DLC / AR | 8 - 12 | DLC 8μm - 12μm Ave R% < 5%<br>AR 8μm - 12μm Ave R% < 1% | BD2 |
| IR - 3 | AR / AR | 3 - 5 | AR 3μm - 5μm Ave R% < 1% | BD2 |
| IR - 4 | AR / AR | 1.8 - 3 | AR 1.8μm - 3μm Ave R%:<1% | BD2 |
| IR - 6 | AR / AR | 8 - 12 | AR 8μm - 12μm Ave R%: <0.75% | BD6 |
| IR - 6 SWB | AR SWB* / AR | 8 - 12 | AR SWB 2μm - 5μm Ave T% <15%<br>AR SWB 8μm - 12μm Ave R%: <2%<br>AR 8μm - 12μm Ave R%: <0.75% | BD6 |
| IR - 7 | DLC / AR | 8 - 12 | DLC 8μm - 12μm Ave R%: <5%<br>AR 8μm - 12μm Ave R%: <1% | BD6 |
| IR - 8 | AR HD* / AR | 8 - 12 | AR 8μm - 12μm Ave R%: <0.75%<br>HD 8μm - 12μm Ave R%: <0.75% | BD6 |

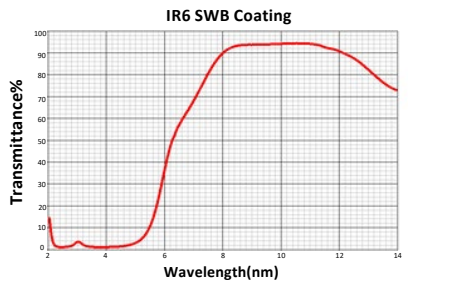
*SWB：Short Wavelength Band
*HD:High Durability

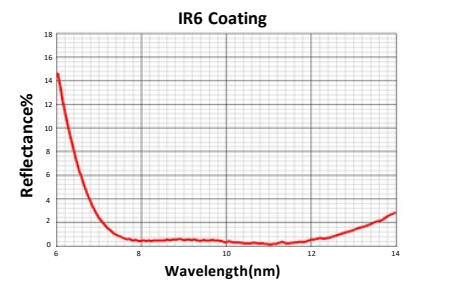
## Typical MWIR-LWIR Coating Curves

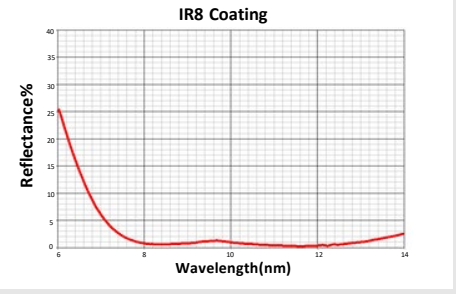


## BlackDiamond™ Chalcogenide Glass

With over ten years of experience in Chalcogenide Glass production, LightPath produces a variety of different Chalcogenide glasses in its Orlando, Florida facility.

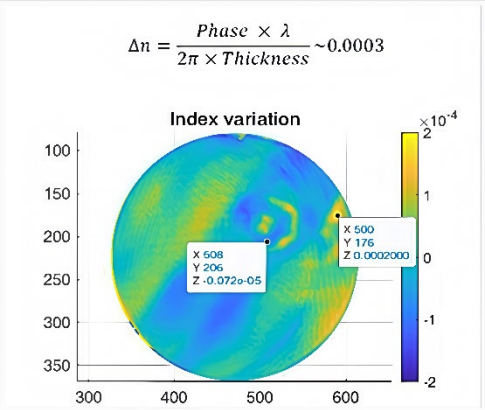
All of LightPath's Black Diamond Chalcogenide glasses are produced in boules of 120mm diameter, and can be further expanded using our proprietary molding technology, to larger diameters, as needed. Our BlackDiamond materials are designed specifically to have the same refractive index whether diamond turned into lenses, conventionally polished, or molded into final form using our precision glass molding technology.

## High Reliability And Reputability

LightPath Technologies is committed to the reliability and repeatability of our manufactured materials, a commitment underscored by our partnership with the Defense Logistics Agency (DLA). In a rigorous effort to qualify the manufacturing readiness of our optical materials, we have produced and tested hundreds of samples of each material type. This extensive testing regimen has proven our capability to consistently deliver high-quality materials, leading to DLA's approval and our achievement of a level 9 Manufacturing Readiness Level (MRL). This distinction emphasizes our ability to meet exacting standards and ensures that our products are trusted for even the most critical applications in defense and beyond.

## Tight Quality Control

At LightPath Technologies, our dedication to quality control in the manufacturing process is exemplified by our established production capabilities and extensive experience. Annually, we produce 10 tons of glass, a testament to over a decade of refinement and expertise in optical material manufacturing. A key indicator of our stringent quality standards is the homogeneous refractive index across a slice of glass, consistently maintained better than 0.0003. This precision ensures that each piece of glass produced not only meets but exceeds the rigorous performance expectations required in advanced optical applications, showcasing our commitment to reliability and excellence in every product.




| Glass material | Density | Young's Modulus | CTE | dn/dT | Equivalent Glass |
|---|---|---|---|---|---|
| BD2 | 4.67g/cm³ | 22.1GPa | 14 x 10⁻⁶ /° C | 91 x 10⁻⁶ /° C | AMTIR-3/IG5 |
| BD6 | 4.63g/cm³ | 19.8GPa | 22.5 x 10⁻⁶ /° C | 30.5 x 10⁻⁶ /° C | IRG26/IG6 |

## Laser Collimation

Due to the structure of the laser cavity in edge-emitting diode lasers, light is emitted in a divergent elliptical geometry—thus, the divergence is typically specified separately along the x-axis and y-axis. The axis with greater divergence is referred to as the "fast axis," while the axis with smaller divergence is called the "slow axis."

When selecting a lens to collimate a laser, the numerical aperture (NA) of the lens should be considered first. If the application requires coupling a large amount of laser light through the system, a lens with a sufficiently high NA must be chosen. The NA of a lens is a measure of the maximum divergence that the lens can capture from the laser. Ideally, a lens with an NA higher than the fast-axis NA of the laser should be used. Otherwise, the laser will be "clipped" by the lens, resulting in some light being wasted. To convert NA to divergence angle (or vice versa), use the following formula:

$$NA = n \cdot \sin(\phi)$$

In most cases, n = 1, as the NA of a laser is defined in air. Therefore, the solution to the equation simplifies to:

$$(\phi) = \sin^{-1}(NA)$$

It is important to note that this refers to the half-angle of the divergence cone, given at the edge rays (not $1/e^2$ or full-width half-maximum). After determining the minimum NA, the next step is to consider the preferred beam diameter. While ray tracing is necessary to accurately determine the beam diameter for a source with a given NA using a specific lens, it can be approximated using the following formula:

$$\text{Beam Diameter} \cong 2 \cdot EFL \cdot NA$$

Here, EFL refers to the effective focal length of the lens, and NA denotes the numerical aperture of the light source (not the lens). Keep in mind that most edge-emitting diodes have an elliptical beam profile, so the beam diameter will differ along the x-axis and y-axis. Use the formula above to calculate the beam diameter for both axes to determine the shape of the collimated elliptical beam.

If you cannot find the required lens in our catalog, we can provide custom manufacturing services. Our team of engineers can produce custom lenses at the cost of off-the-shelf lenses—a service that is rarely available elsewhere.

Important Note:

Some laser manufacturers specify the numerical aperture (NA) of the light source using different terminologies, such as full-width half-maximum (FWHM, at the 50% point) or $1/e^2$ (at the 87% point). Regardless of the type of value entered into the NA formula for the source, the resulting value for beam diameter will match the same terminology type. For example, if you use the FWHM NA of the laser with the formula above, you will obtain the full-width half-maximum beam diameter.

There is no simple method to convert the half-maximum or $1/e^2$ beam diameter of a specific light source to the full beam diameter, as this depends on the intensity distribution of the source itself. However, for most edge-emitting diode lasers, a reasonable approximation is to assume a Gaussian beam profile. Using this beam profile, you can convert the beam diameter as follows:

1. To convert the full-width half-maximum (FWHM) beam diameter to the full beam diameter (i.e., containing 99% of the power), multiply the diameter by 2.576.
2. To convert the $1/e^2$ beam diameter to the full beam diameter (i.e., containing 99% of the power), multiply the diameter by 1.517.

## Fiber Coupling

Another common application of aspheric lenses is coupling lasers into optical fibers. Selecting a suitable lens for coupling is crucial for maintaining high efficiency in optical systems. The following guide is designed to demonstrate how to best achieve this when using off-the-shelf components. This guide assumes that the input laser is already collimated (with no divergence) and that the optical fiber is multimode (single-mode fibers require more extensive modeling to achieve optimal coupling efficiency). When selecting a lens to focus light into an optical fiber, the first consideration is the required focal length of the lens. Let us revisit the formula provided earlier:

$$\text{Beam Diameter} \cong 2 \cdot \text{EFL} \cdot \text{NA}$$

**solving for EFL it becomes:**

$$\text{EFL} \cong \frac{\text{Beam Diameter}}{2 \cdot \text{NA}}$$

Here, NA refers to the numerical aperture of the optical fiber used for coupling. It is important to note that the EFL value calculated above is the minimum EFL required to fully couple light into the fiber. Lenses with longer EFLs can be used, but the spot size on the fiber tip will increase. Therefore, the best practice is to use the shortest EFL lens that is as large as possible than the minimum value specified above.

Example: Suppose you want to focus a collimated beam with a full beam diameter of 2.0 mm into a 50 µm multimode optical fiber. The manufacturer specifies the fiber's NA as approximately 0.20. Fiber NA is typically given at the 99% power point (as opposed to $1/e^2$ or half-maximum), allowing us to use the provided full beam diameter.

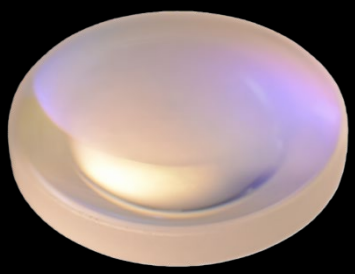
$$\text{EFL} \cong \frac{\text{Beam Diameter}}{2\ \text{NA}} \cong \frac{2.0}{2 \cdot 0.2} \cong 5.0\text{mm}$$

Therefore, it is best to look for a lens with an EFL of at least 5.0 mm and a clear aperture of 2.0 mm (to capture the full collimated beam). One might consider using the 354430 lens, which has a 5 mm EFL (at 1550 nm), but its 1.5 mm clear aperture is insufficient to capture the full collimated beam. A better option may be the 354550 lens: its EFL is 6.10 mm at 1550 nm and shifts to 5.94 mm at 660 nm. This lens also features a sufficiently large clear aperture (2.2 mm) to capture the entire input beam.

# LightPath Technologies

**For over 40 years, LightPath Technologies has been at the forefront of optics and photonics innovation, delivering cutting-edge solutions to industrial, defense, telecommunications, medical, and test & measurement markets.**

**We specialize in custom-engineered VIS & IR optics, designed to meet the most demanding performance requirements. From precision-molded lenses to advanced infrared imaging solutions, our expertise ensures reliability, accuracy, and seamless integration for your critical application.**



## LightPath -
## Pioneering Advanced Optics & Photonics Solutions

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