

GLOBAL LEADER IN OPTICAL TECHNOLOGY

LightPath[®]
..... TECHNOLOGIES



Geltech Molded Aspheric Lenses



www.lightpath.com

ABOUT LIGHTPATH TECHNOLOGIES



LightPath Technologies, Inc. (NASDAQ: LPTH) is a leading global, vertically integrated provider of optics, photonics and infrared solutions for the industrial, commercial, defense, telecommunications, and medical industries. LightPath designs, manufactures, and distributes proprietary optical and infrared components including molded glass aspheric lenses and assemblies, infrared lenses and thermal imaging assemblies, fused fiber collimators, and proprietary Black Diamond™ (“BD6”) chalcogenide-based glass lenses. LightPath also offers custom optical assemblies, including full engineering design support. The Company is headquartered in Orlando, Florida, with manufacturing and sales offices in Latvia and China.

LightPath’s wholly-owned subsidiary, ISP Optics Corporation, manufactures a full range of infrared products from high performance MWIR and LWIR lenses and lens assemblies. ISP’s infrared lens assembly product line includes athermal lens systems used in cooled and un-cooled thermal imaging cameras. Manufacturing is performed in-house to provide precision optical components including spherical, aspherical and diffractive coated infrared lenses. ISP’s optics processes allow it to manufacture its products from all important types of infrared materials and crystals. Manufacturing processes include CNC grinding and CNC polishing, diamond turning, continuous and conventional polishing, optical contacting and advanced coating technologies.



OUR VISION

Grow LightPath Technologies into an optical solution company that is a fully integrated manufacturer and supplier of visible and infrared optical components and sub-systems, based on world class optical manufacturing technology.





| | |
|-------------------------------|-------|
| Performance and Customization | 04 |
| Additional Options | 05 |
| Standard Aspheric Designs | 06-07 |
| Products | 08-15 |
| Connectorized Collimators | 16 |
| Mounted Aspheric Lenses | 17 |
| Glass Types | 18 |
| Coating Options | 19 |

CHOOSE FROM A VARIETY OF FORM FACTORS FOR CUSTOM DESIGNS

LightPath's unique molding process allows us to custom manufacture lenses based on specific requirements. We can provide lenses in a number of different form factors from a simple aspheric lens, to a lens array, and even a lens molded into a metal housing. Some of LightPath's lens molding capabilities include:

- Lens Arrays
- Anamorphic Lenses
- Insert Molding (molded into a metal holder)
- Cylindrical Metal Holders
- Square Holders
- T-Holders
- Custom Holders
- Freeform Optics



C-LENS (MOLDED ASPHERIC)

Custom available C-Type Aspheric lenses (collimating rods) are offered as part of the small beam air-gap collimator assembly. These are available as molded lenses having an angled plano surface on one end to prevent back reflections and an aspheric surface on the other. Compared with our standard molded aspheres, these lenses offer the same superior optical performance, however, in a rod form compatible with fiber integration. These lenses offer unprecedented technological advantages for low loss fiber coupling applications such as optical telecommunications, and advanced aerospace communication systems.

NUMERICAL APERTURE

Our molded aspheric lenses are available with numerical apertures ranging from 0.15 up to 0.77. Applications that would use a low numerical aperture include bar code scanners, surveying instruments, and small weapons sights. High numerical aperture applications include data storage and industrial printing.

SHAPES AND SIZES

With lenses available in a multitude of shapes and sizes, up to 23mm in diameter, LightPath will be able to provide you with the perfect lens for your unique application.

DIFFRACTIVE HYBRID LENSES

Combining a refractive aspheric lens with a diffractive feature can achieve sophisticated beam shaping of laser light. Diffractive hybrid lenses can also be used to make a system achromatic over a range of wavelengths. LightPath hybrid lenses can be customized to each application.

DIFFRACTION LIMITED PERFORMANCE

Most LightPath lenses are designed to be diffraction limited, and are measured on a phase shift interferometer.

ASSEMBLIES

By leveraging our broad optical component portfolio, LightPath has been implementing sophisticated integrated optical assemblies. Our in-house engineering staff can design custom assemblies, including complex imaging systems for camera systems, to your exact specifications. Additional services include thermal analysis and athermalization for better performance across a large temperature range.

GLASS DICING AND LENS EDGING

LightPath has the ability to dice lenses and glass to precision shapes and sizes. We can dice optics within a tolerance of $\pm 5\mu\text{m}$ and hold edge chipping $<15\mu\text{m}$ depending on the condition of glass used. In addition, we can dice lens center lined to edge within microns. We have experience in dicing lens arrays, wafers and custom lens shapes. LightPath uses multi-blade dicing gangs to increase our capacity to dice in higher volumes.

FREEFORM

Freeform optics involve optical designs with at least one freeform surface which has no translational or rotational symmetry about axes normal to the mean plane. LightPath's precision glass molding is a viable process for the cost-effective volume production of freeform optics.

| Manufacturing Tolerances | |
|-------------------------------|----------------------|
| Parameter | Typical Tolerance |
| Focal Length | $\pm 1\%$ |
| Center Thickness (CT) | $\pm 0.025\text{mm}$ |
| Outer Diameter (OD) | $\pm 0.015\text{mm}$ |
| Wedge (arcmin) | 4 |
| Power/Irregularity (fringes) | 3/1 |
| Surface Roughness | 15nm |
| Surface Quality (scratch/dig) | 40/20 |
| RMS WFE | Diffraction Limited |

CUSTOMIZABILITY

LightPath offers the option to design a custom lens to meet your specifications. Our in-house engineering and manufacturing teams will work with you to design a lens to meet your unique needs. LightPath also offers a wide range of custom coatings. Custom coatings include dual band, triple band, and V anti-reflection coatings. LightPath can also provide reflectivity coatings for aspheric mirror applications.

INSERT MOLDING

LightPath's lenses can be molded directly into metallic holders, allowing the lenses to be welded or soldered into the package and eliminating the need to use epoxy. This can be an ideal solution for high volume automated assembly or in applications where strict outgassing requirements preclude the use of epoxy adhesives.

Contact us today for a quote on your custom design.



DID YOU KNOW?

We can blacken the edge of your lens.

STANDARD ASPHERIC DESIGNS

HIGH-PERFORMANCE OPTICS FOR A VARIETY OF APPLICATIONS

- Benefit from the quality and performance of all-glass aspheres
- Easily transition from prototype phase to high-volume production
- Customize to fit your application or choose from over 100 standard aspheric designs
- RoHS-compliant, ultra-high quality glass

Aspheric lenses are known for their optimal performance but the expense of fabricating them has inhibited their use. LightPath's glass molding technology has enabled high volume production of aspheric optics while maintaining the highest quality at an affordable price. Because molding is the most consistent and economical way to produce aspheres in large volumes, LightPath has perfected this method to offer the most precise aspheric lens available. LightPath offers standard and custom-made lenses, all designed by our expert optical design engineers.

| Geltech Asphere Performance Parameters | | | | | |
|--|-------------------|--------------------|---------------------|-----------------------|------|
| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Page |
| 355104 | 0.3 | 0.65 | 1.6 | 0.150 / .975 | 8 |
| 355631 | 0.39 | 0.55 / 0.13 | 1.20 x 1.20 | 0.284 / 1.902 | 8 |
| 355070 | 0.43 | 0.06 / 0.66 | 1.20 x 1.20 | 5.00 / 0.270 | 8 |
| 355485 | 0.55 | 0.50 / 0.10 | 1.00 | 0.30 / 3.030 | 8 |
| 355487 | 0.55 | 0.50 / 0.11 | 1.00 | 0.276 / 2.940 | 8 |
| 355465 | 0.55 | 0.50 / 0.10 | 1.0 x 1.0 | 0.250 / 2.874 | 8 |
| 355536 | 0.60 | 0.60 | 1.24 | 0.22 | 8 |
| 355880 | 0.70 | 0.60 | 2.50 | 0.33 | 8 |
| 355840 | 0.75 | 0.47 | 3.00 | 0.43 | 8 |
| 355915 | 0.80 | 0.12 / 0.50 | 1.30 | 3.931 / 0.669 | 8 |
| 355960 | 1.00 | 0.62 | 1.824 | 0.24 | 9 |
| 355198 | 1.05 | 0.5 | 1.4 | .610 | 9 |
| 355200 | 1.14 | 0.43 / 0.124 | 2.40 | 4.81 | 9 |
| 355201 | 1.14 | 0.124 / 0.430 | 4.93 | 1.129 / 4.809 | 9 |
| 354450 | 1.16 | 0.30 / 0.30 | 1.80 | 1.67 / 1.67 | 9 |
| 357786 | 1.41 | 0.502 | 2.00 | 1.20 | 9 |
| 356785 | 1.42 | 0.62 | 2.75 | 0.86 | 9 |
| 354710 | 1.49 | 0.53 | 2.65 | 1.02 | 9 |

| Geltech Asphere Performance Parameters | | | | | |
|--|-------------------|--------------------|---------------------|-----------------------|------|
| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Page |
| 355957 | 1.8 | 0.4 | 3.0 | 1.1 | 9 |
| 355755 | 1.94 | 0.15 / 0.15 | 1.70 | 3.570 / 3.570 | 10 |
| 355150 | 2.00 | 0.5 | 3.00 | 1.4 | 10 |
| 355151 | 2.00 | 0.504 | 3.00 | 1.029 | 10 |
| 355410 | 2.51 | 0.20 | 1.805 | 1.84 | 10 |
| 355615 | 2.51 | 0.201 | 2.05 | 1.731 | 10 |
| 355945 | 2.51 | 0.317 | 3.00 | 1.761 | 10 |
| 356300 | 2.54 | 0.66 | 4.00 | 1.55 | 10 |
| 355160 | 2.73 | 0.55 | 4.00 | 2.37 | 10 |
| 355390 | 2.75 | 0.55 | 4.50 | 2.16 | 10 |
| 355440 | 2.76 | 0.52 / 0.26 | 4.70 | 7.090 / 2.713 | 10 |
| 355392 | 2.80 | 0.6 | 4.00 | 1.5 | 11 |
| 355660 | 2.976 | 0.52 | 4.00 | 1.56 | 11 |
| 354330 | 3.10 | 0.7 | 6.325 | 1.8 | 11 |
| 355330 | 3.10 | 0.77 | 6.325 | 1.59 | 11 |
| 353515 | 3.50 | 0.4 | 3.00 | 2.3 | 11 |
| 355545 | 3.50 | 0.38 | 3.50 | 2.3 | 11 |
| 355970 | 3.70 | 0.21 | 1.80 | 3.030 | 11 |

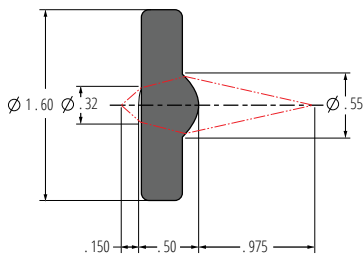
Geltech Asphere Performance Parameters

| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Page |
|-----------|-------------------|--------------------|---------------------|-----------------------|------|
| 355970 | 3.70 | 0.21 | 1.80 | 3.030 | 11 |
| 357775 | 4.00 | 0.6 | 6.325 | 2.4 | 11 |
| 357610 | 4.00 | 0.616 | 6.325 | 2.691 | 11 |
| 357765 | 4.00 | 0.61 | 6.325 | 2.37 | 11 |
| 355940 | 4.02 | 0.17 | 3.00 | 3.37 | 12 |
| 354340 | 4.03 | 0.64 | 6.325 | 2.68 | 12 |
| 355625 | 4.13 | 0.55 | 5.585 | 2.2 | 12 |
| 355022 | 4.47 | 0.47 | 5.42 | 3.08 | 12 |
| 354350 | 4.50 | 0.4 | 4.70 | 2.2 | 12 |
| 354996 | 4.50 | 0.30 | 3.00 | 3.46 | 12 |
| 355230 | 4.50 | 0.55 | 6.325 | 3.08 | 12 |
| 354453 | 4.60 | 0.5 | 6.00 | 2.7 | 12 |
| 354430 | 5.00 | 0.15 | 2.00 | 4.37 | 12 |
| 354105 | 5.50 | 0.6 | 7.20 | 3.7 | 12 |
| 354130 | 6.00 | 0.21 | 3.00 | 4.90 | 13 |
| 354550 | 6.10 | 0.18 | 2.79 | 4.87 | 13 |
| 354171 | 6.20 | 0.30 | 4.70 | 4.10 | 13 |
| 355110 | 6.20 | 0.4 | 7.20 | 3.5 | 13 |
| 354525 | 6.70 | 0.44 | 6.650 | 4.9 | 13 |
| 354115 | 6.80 | 0.5 | 9.20 | 4.3 | 13 |

Geltech Asphere Performance Parameters

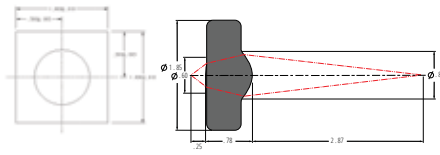
| Lens Code | Focal Length (mm) | Numerical Aperture | Outer Diameter (mm) | Working Distance (mm) | Page |
|-----------|-------------------|--------------------|---------------------|-----------------------|------|
| 355375 | 7.50 | 0.3 | 6.51 | 5.8 | 13 |
| 354240 | 8.00 | 0.5 | 9.936 | 5.9 | 13 |
| 354060 | 9.60 | 0.30 | 6.325 | 8.13 | 13 |
| 354306 | 9.90 | 0.3 | 6.335 | 8.4 | 13 |
| 354125 | 10.00 | 0.5 | 11.00 | 7.8 | 14 |
| 355561 | 10.00 | 0.6 | 15.00 | 7.0 | 14 |
| 354220 | 11.00 | 0.3 | 7.20 | 7.9 | 14 |
| 354061 | 11.00 | 0.24 | 6.325 | 9.56 | 14 |
| 354062 | 11.00 | 0.24 | 6.00 | 9.66 | 14 |
| 354064 | 11.00 | 0.24 | 6.00 | 9.3 | 14 |
| 355397 | 11.00 | 0.3 | 7.20 | 10.0 | 14 |
| 354058 | 12.00 | 0.22 | 6.325 | 10.57 | 14 |
| 354057 | 13.00 | 0.20 | 6.325 | 11.58 | 14 |
| 354560 | 13.86 | 0.18 | 6.325 | 12.11 | 14 |
| 354059 | 14.00 | 0.19 | 6.325 | 12.63 | 15 |
| 354120 | 15.04 | 0.15 | 4.985 | 13.19 | 15 |
| 354260 | 15.29 | 0.16 | 6.50 | 13.98 | 15 |
| 354280 | 18.40 | 0.15 | 6.50 | 17.11 | 15 |
| 354850 | 22.00 | 0.13 | 6.325 | 20.41 | 15 |

PRODUCT DESCRIPTION



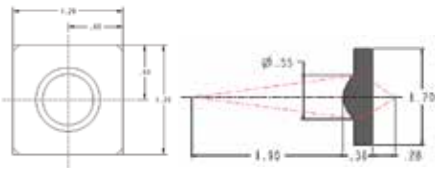
355104

| | |
|--------------------|-----------|
| Design Wavelength | 1300 |
| Focal Length | 0.3 |
| Numerical Aperture | 0.65 |
| Clear Aperture | 0.29/0.48 |



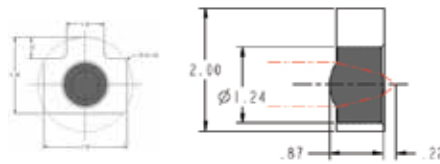
355465

| | |
|--------------------|-----------|
| Design Wavelength | 1310 |
| Focal Length | 0.55 |
| Numerical Aperture | 0.50/0.10 |
| Clear Aperture | 0.40/0.70 |



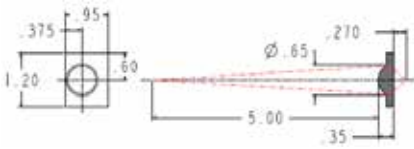
355631

| | |
|--------------------|-----------|
| Design Wavelength | 1310 |
| Focal Length | 0.39 |
| Numerical Aperture | 0.55/0.13 |
| Clear Aperture | 0.37/0.53 |



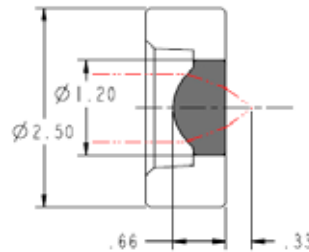
355536

| | |
|--------------------|-----------|
| Design Wavelength | 1310 |
| Focal Length | 0.60 |
| Numerical Aperture | 0.60 |
| Clear Aperture | 0.72/0.35 |



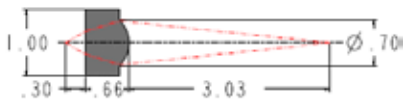
355070

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 0.43 |
| Numerical Aperture | 0.06/0.66 |
| Clear Aperture | 0.62/0.47 |



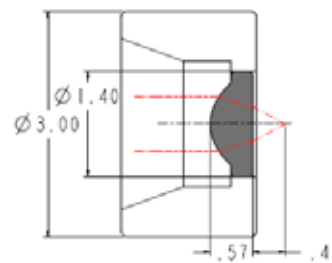
355880

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 0.70 |
| Numerical Aperture | 0.60 |
| Clear Aperture | 0.84/0.49 |



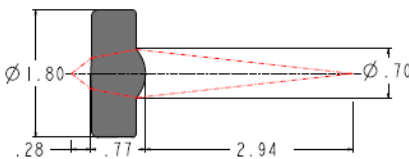
355485

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 0.55 |
| Numerical Aperture | 0.50/0.10 |
| Clear Aperture | 0.35/0.66 |



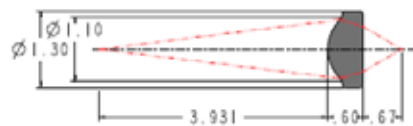
355840

| | |
|--------------------|-----------|
| Design Wavelength | 940 |
| Focal Length | 0.75 |
| Numerical Aperture | 0.47 |
| Clear Aperture | 0.71/0.46 |



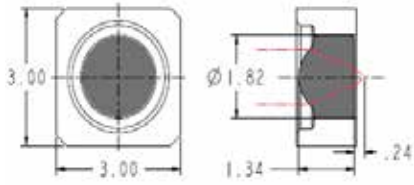
355487

| | |
|--------------------|-----------|
| Design Wavelength | 1500 |
| Focal Length | 0.55 |
| Numerical Aperture | 0.50/0.11 |
| Clear Aperture | 0.35/0.68 |



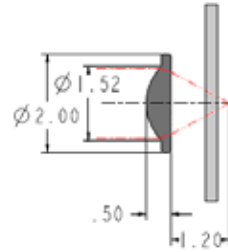
355915

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 0.80 |
| Numerical Aperture | 0.12/0.50 |
| Clear Aperture | 1.00/0.77 |



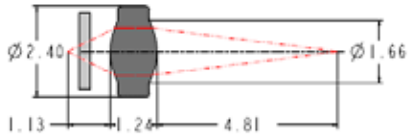
355960

| | |
|--------------------|-----------|
| Design Wavelength | 1500 |
| Focal Length | 1.00 |
| Numerical Aperture | 0.62 |
| Clear Aperture | 1.20/0.39 |



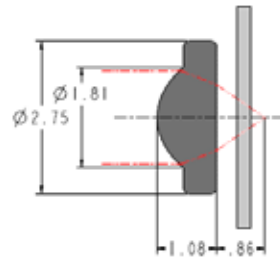
357786

| | |
|--------------------|-----------|
| Design Wavelength | 488 |
| Focal Length | 1.41 |
| Numerical Aperture | 0.502 |
| Clear Aperture | 1.42/1.28 |



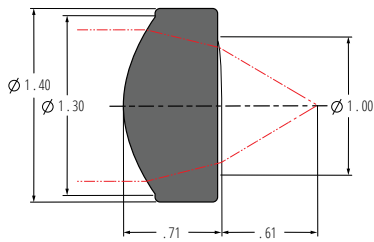
355200

| | |
|--------------------|------------|
| Design Wavelength | 1300 |
| Focal Length | 1.14 |
| Numerical Aperture | 0.43/0.124 |
| Clear Aperture | 1.24/1.24 |



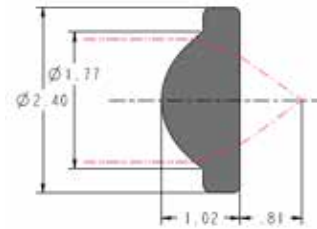
356785

| | |
|--------------------|-----------|
| Design Wavelength | 488 |
| Focal Length | 1.42 |
| Numerical Aperture | 0.62 |
| Clear Aperture | 1.70/1.18 |



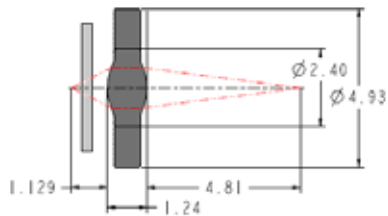
355198

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 1.05 |
| Numerical Aperture | 0.5 |
| Clear Aperture | 1.10/0.84 |



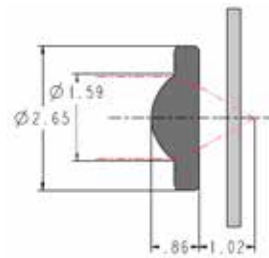
354140

| | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 1.45 |
| Numerical Aperture | 0.58 |
| Clear Aperture | 1.60/1.14 |



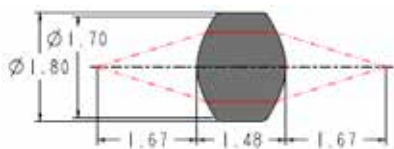
355201

| | |
|--------------------|-----------|
| Design Wavelength | 1300 |
| Focal Length | 1.14 |
| Numerical Aperture | 0.124 |
| Clear Aperture | 1.24/1.24 |



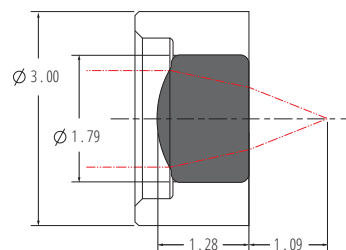
354710

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 1.49 |
| Numerical Aperture | 0.53 |
| Clear Aperture | 1.50/1.15 |



354450

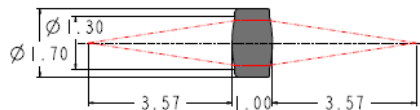
| | |
|--------------------|-----------|
| Design Wavelength | 980 |
| Focal Length | 1.16 |
| Numerical Aperture | 0.30 |
| Clear Aperture | 1.14/1.14 |



355957

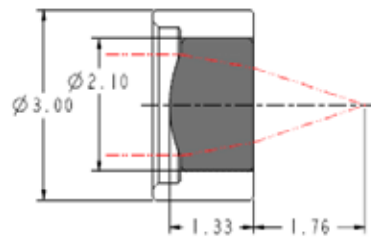
| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 1.8 |
| Numerical Aperture | 0.4 |
| Clear Aperture | 1.35/0.87 |

PRODUCT DESCRIPTION



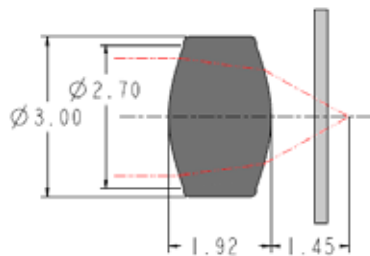
355755

| | |
|--------------------|-----------|
| Design Wavelength | 1577 |
| Focal Length | 1.94 |
| Numerical Aperture | 0.15/0.15 |
| Clear Aperture | 1.10/1.10 |



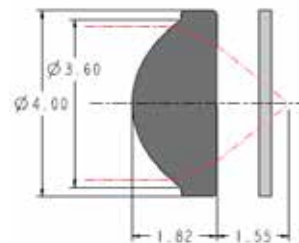
355945

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 2.51 |
| Numerical Aperture | 0.317 |
| Clear Aperture | 1.60/1.18 |



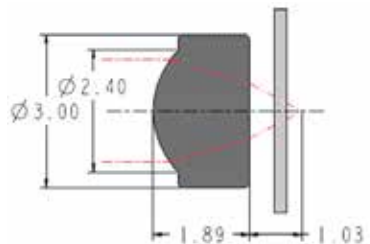
355150

| | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 2.00 |
| Numerical Aperture | 0.5 |
| Clear Aperture | 2.20/2.20 |



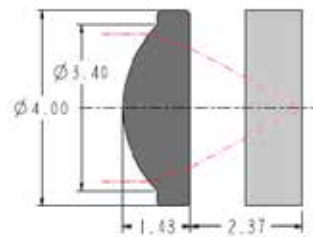
356300

| | |
|--------------------|-----------|
| Design Wavelength | 405 |
| Focal Length | 2.54 |
| Numerical Aperture | 0.66 |
| Clear Aperture | 3.30/2.50 |



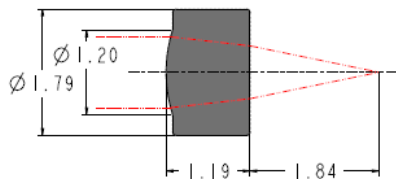
355151

| | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 2.00 |
| Numerical Aperture | 0.504 |
| Clear Aperture | 2.00/1.09 |



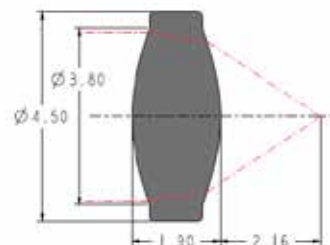
355160

| | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 2.73 |
| Numerical Aperture | 0.55 |
| Clear Aperture | 3.00/2.44 |



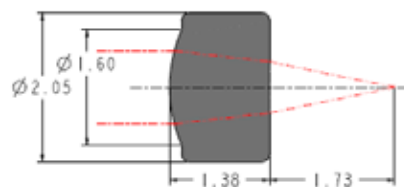
355410

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 2.51 |
| Numerical Aperture | 0.20 |
| Clear Aperture | 1.01/0.75 |



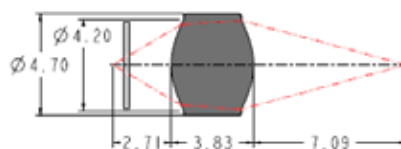
355390

| | |
|--------------------|-----------|
| Design Wavelength | 830 |
| Focal Length | 2.75 |
| Numerical Aperture | 0.55 |
| Clear Aperture | 3.60/3.24 |



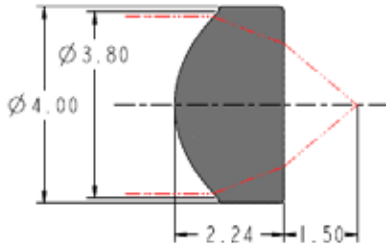
355615

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 2.51 |
| Numerical Aperture | 0.201 |
| Clear Aperture | 1.01/0.71 |



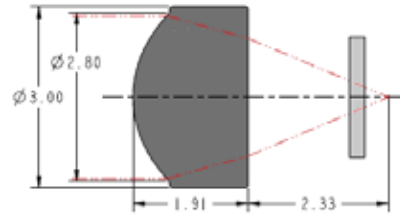
355440

| | |
|--------------------|-----------|
| Design Wavelength | 980 |
| Focal Length | 2.76 |
| Numerical Aperture | 0.52/0.26 |
| Clear Aperture | 4.12/4.12 |



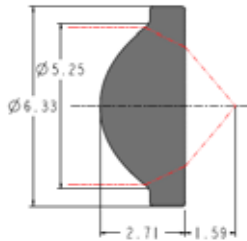
355392

| | |
|--------------------|-----------|
| Design Wavelength | 830 |
| Focal Length | 2.80 |
| Numerical Aperture | 0.6 |
| Clear Aperture | 3.60/2.50 |



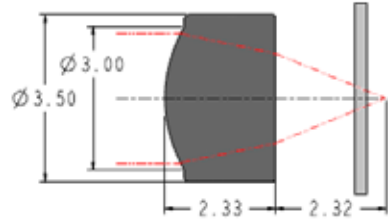
35515

| | |
|--------------------|-----------|
| Design Wavelength | 515 |
| Focal Length | 3.50 |
| Numerical Aperture | 0.4 |
| Clear Aperture | 2.70/1.95 |



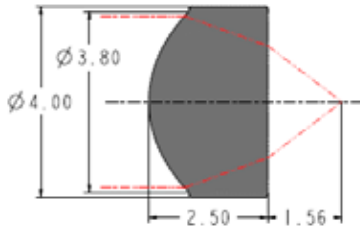
355330

| | |
|--------------------|-----------|
| Design Wavelength | 830 |
| Focal Length | 3.10 |
| Numerical Aperture | 0.77 |
| Clear Aperture | 5.00/3.79 |



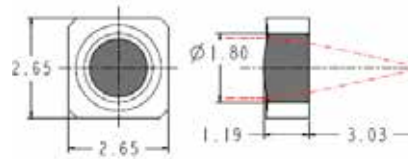
355545

| | |
|--------------------|-----------|
| Design Wavelength | 515 |
| Focal Length | 3.50 |
| Numerical Aperture | 0.38 |
| Clear Aperture | 2.71/1.88 |



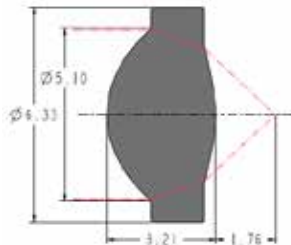
355660

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 2.976 |
| Numerical Aperture | 0.52 |
| Clear Aperture | 3.60/2.35 |



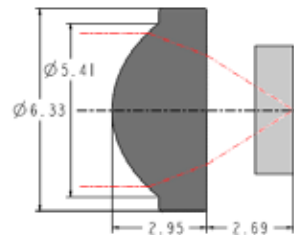
355970

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 3.70 |
| Numerical Aperture | 0.21 |
| Clear Aperture | 1.56/1.30 |



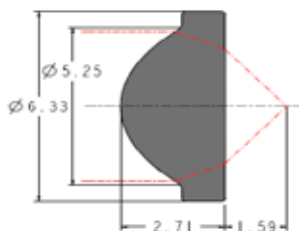
354330

| | |
|--------------------|-----------|
| Design Wavelength | 830 |
| Focal Length | 3.10 |
| Numerical Aperture | 0.7 |
| Clear Aperture | 5.00/3.84 |



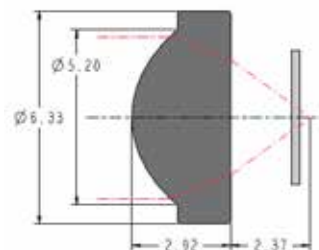
357610

| | |
|--------------------|-----------|
| Design Wavelength | 410 |
| Focal Length | 4.00 |
| Numerical Aperture | 0.616 |
| Clear Aperture | 4.80/3.39 |



355330

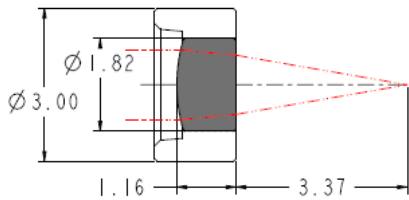
| | |
|--------------------|-----------|
| Design Wavelength | 830 |
| Focal Length | 3.10 |
| Numerical Aperture | 0.77 |
| Clear Aperture | 5.00/3.61 |



357765

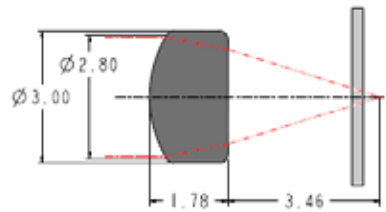
| | |
|--------------------|-----------|
| Design Wavelength | 488 |
| Focal Length | 4.00 |
| Numerical Aperture | 0.61 |
| Clear Aperture | 4.80/3.43 |

PRODUCT DESCRIPTION



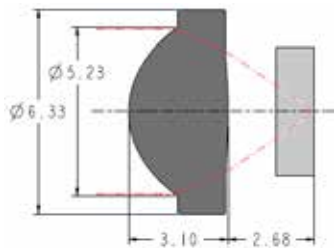
355940

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 4.02 |
| Numerical Aperture | 0.17 |
| Clear Aperture | 1.37/1.16 |



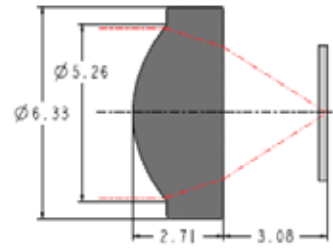
354996

| | |
|--------------------|-----------|
| Design Wavelength | 634 |
| Focal Length | 4.50 |
| Numerical Aperture | 0.30 |
| Clear Aperture | 2.70/2.15 |



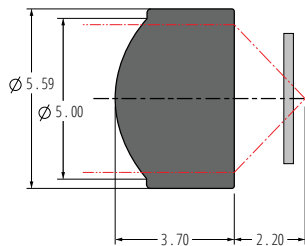
354340

| | |
|--------------------|-----------|
| Design Wavelength | 685 |
| Focal Length | 4.03 |
| Numerical Aperture | 0.64 |
| Clear Aperture | 5.10/3.77 |



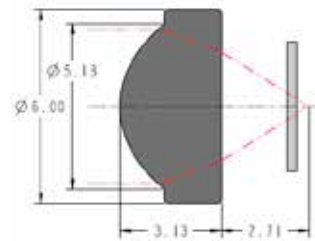
355230

| | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 4.50 |
| Numerical Aperture | 0.55 |
| Clear Aperture | 5.07/3.93 |



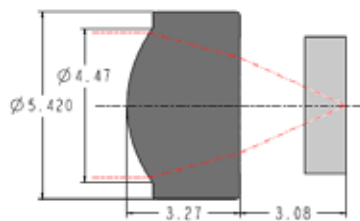
355625

| | |
|--------------------|-----------|
| Design Wavelength | 447 |
| Focal Length | 4.13 |
| Numerical Aperture | 0.55 |
| Clear Aperture | 4.60/4.60 |



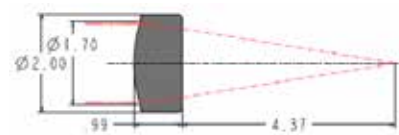
354453

| | |
|--------------------|-----------|
| Design Wavelength | 655 |
| Focal Length | 4.60 |
| Numerical Aperture | 0.5 |
| Clear Aperture | 4.80/3.38 |



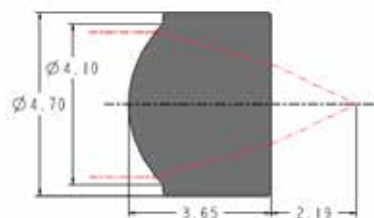
355022

| | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 4.47 |
| Numerical Aperture | 0.47 |
| Clear Aperture | 4.20/2.77 |



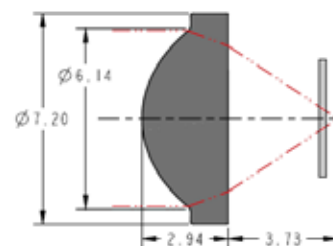
354430

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 5.00 |
| Numerical Aperture | 0.15 |
| Clear Aperture | 1.60/1.40 |



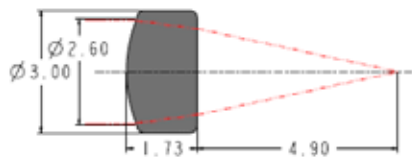
354350

| | |
|--------------------|-----------|
| Design Wavelength | 980 |
| Focal Length | 4.50 |
| Numerical Aperture | 0.4 |
| Clear Aperture | 3.70/2.05 |



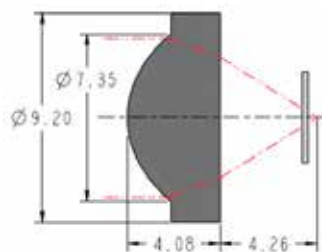
354105

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 5.50 |
| Numerical Aperture | 0.6 |
| Clear Aperture | 6.00/4.96 |



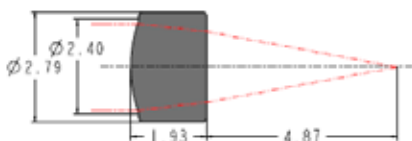
354130

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 6.00 |
| Numerical Aperture | 0.21 |
| Clear Aperture | 2.50/2.10 |



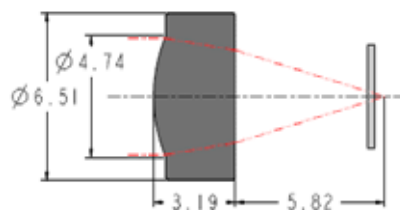
354115

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 6.80 |
| Numerical Aperture | 0.5 |
| Clear Aperture | 7.00/5.30 |



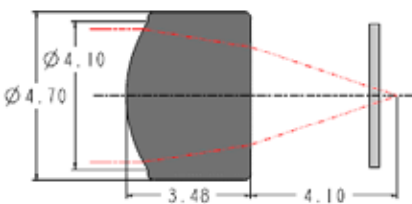
354550

| | |
|--------------------|-----------|
| Design Wavelength | 1550 |
| Focal Length | 6.10 |
| Numerical Aperture | 0.18 |
| Clear Aperture | 2.20/1.79 |



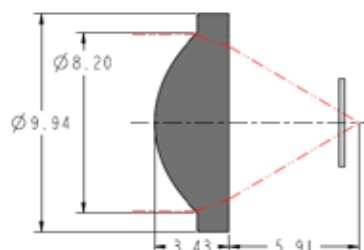
355375

| | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 7.50 |
| Numerical Aperture | 0.3 |
| Clear Aperture | 4.54/3.61 |



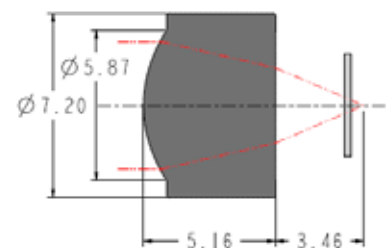
354171

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 6.20 |
| Numerical Aperture | 0.30 |
| Clear Aperture | 3.70/2.72 |



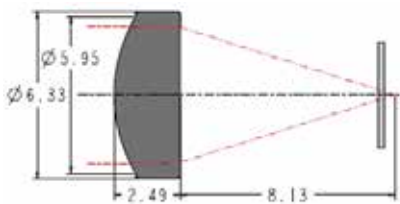
354240

| | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 8.00 |
| Numerical Aperture | 0.5 |
| Clear Aperture | 8.00/6.94 |



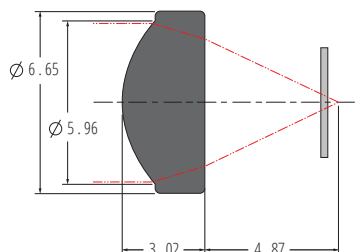
355110

| | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 6.20 |
| Numerical Aperture | 0.4 |
| Clear Aperture | 5.00/2.93 |



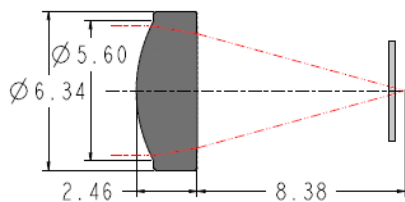
354060

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 9.60 |
| Numerical Aperture | 0.30 |
| Clear Aperture | 5.20/5.13 |



354525

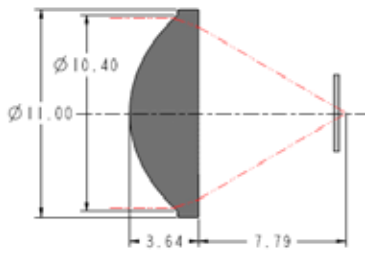
| | |
|--------------------|-----------|
| Design Wavelength | 515 |
| Focal Length | 6.70 |
| Numerical Aperture | 0.44 |
| Clear Aperture | 5.75/4.66 |



354306

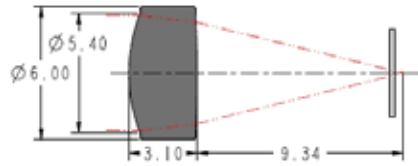
| | |
|--------------------|-----------|
| Design Wavelength | 650 |
| Focal Length | 9.90 |
| Numerical Aperture | 0.3 |
| Clear Aperture | 5.20/4.57 |

PRODUCT DESCRIPTION



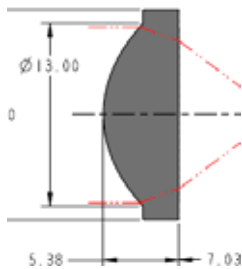
354125

| | |
|--------------------|------------|
| Design Wavelength | 633 |
| Focal Length | 10.00 |
| Numerical Aperture | 0.5 |
| Clear Aperture | 10.00/9.12 |



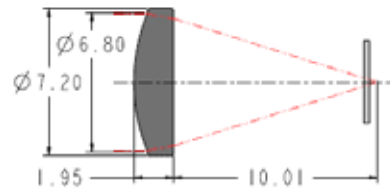
354064

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 11.00 |
| Numerical Aperture | 0.24 |
| Clear Aperture | 5.20/4.59 |



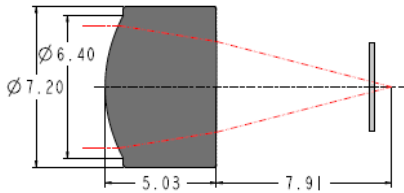
355561

| | |
|--------------------|-------------|
| Design Wavelength | 850 |
| Focal Length | 10.00 |
| Numerical Aperture | 0.6 |
| Clear Aperture | 12.50/10.53 |



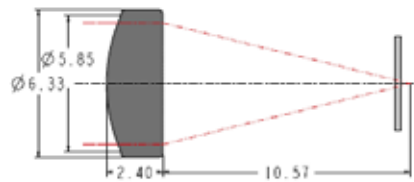
355397

| | |
|--------------------|-----------|
| Design Wavelength | 670 |
| Focal Length | 11.00 |
| Numerical Aperture | 0.3 |
| Clear Aperture | 6.68/6.24 |



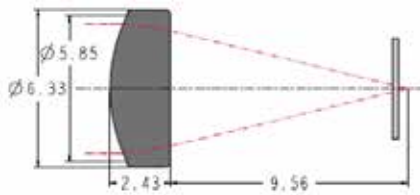
354220

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 11.00 |
| Numerical Aperture | 0.3 |
| Clear Aperture | 5.50/4.07 |



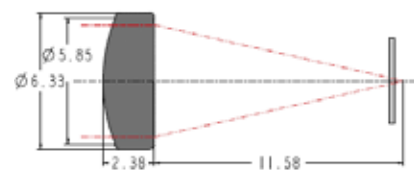
354058

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 12.00 |
| Numerical Aperture | 0.22 |
| Clear Aperture | 5.20/5.20 |



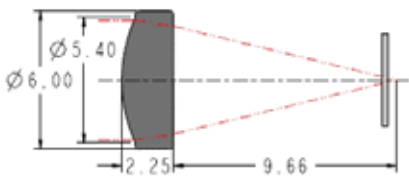
354061

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 11.00 |
| Numerical Aperture | 0.24 |
| Clear Aperture | 5.20/4.63 |



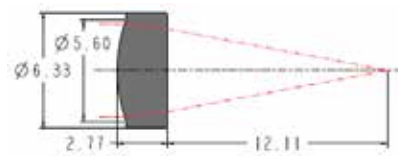
354057

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 13.00 |
| Numerical Aperture | 0.20 |
| Clear Aperture | 5.20/5.20 |



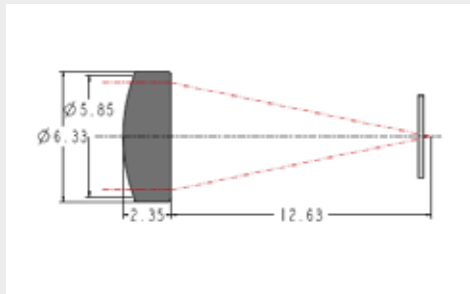
354062

| | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 11.00 |
| Numerical Aperture | 0.24 |
| Clear Aperture | 5.20/4.68 |

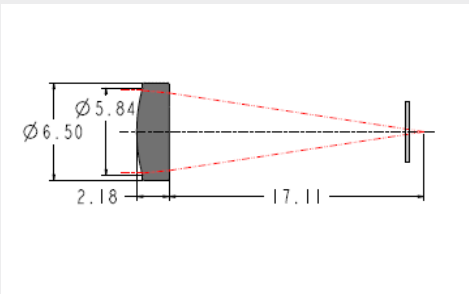


354560

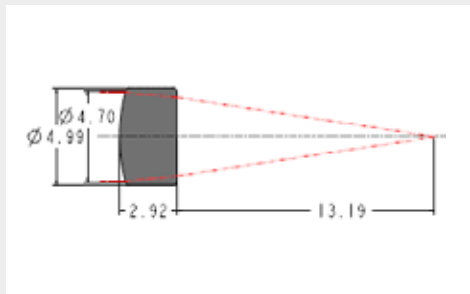
| | |
|--------------------|-----------|
| Design Wavelength | 650 |
| Focal Length | 13.86 |
| Numerical Aperture | 0.18 |
| Clear Aperture | 5.10/4.54 |



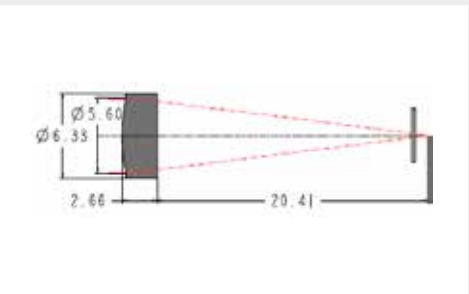
| 354059 | |
|--------------------|-----------|
| Design Wavelength | 633 |
| Focal Length | 14.00 |
| Numerical Aperture | 0.19 |
| Clear Aperture | 5.20/5.20 |



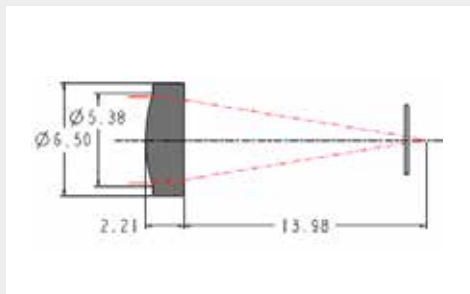
| 354280 | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 18.40 |
| Numerical Aperture | 0.15 |
| Clear Aperture | 5.50/5.15 |



| 354120 | |
|--------------------|-----------|
| Design Wavelength | 670 |
| Focal Length | 15.04 |
| Numerical Aperture | 0.15 |
| Clear Aperture | 4.50/4.00 |



| 354850 | |
|--------------------|-----------|
| Design Wavelength | 670 |
| Focal Length | 22.00 |
| Numerical Aperture | 0.13 |
| Clear Aperture | 5.50/5.13 |



| 354260 | |
|--------------------|-----------|
| Design Wavelength | 780 |
| Focal Length | 15.29 |
| Numerical Aperture | .016 |
| Clear Aperture | 5.00/4.61 |



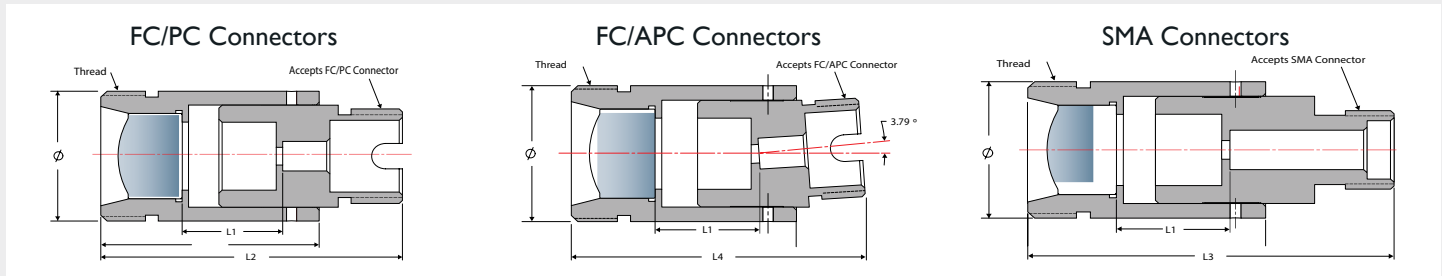
Infrared Laser Collimation Lenses

| Part Number | Design Wavelength | Numerical Aperture | Clear Aperture | Effective Focal Length | Outer Diameter | Working Distance | Center Thickness |
|-------------|-------------------|--------------------|----------------|------------------------|----------------|------------------|------------------|
| 390036 | 2.5μm | 0.56 | 5.0mm | 4.0mm | 6.5mm | 3.05mm | 2.50mm |
| 390042 | 2.5μm | 0.23 | 10.0mm | 19.04mm | 12.5mm | 16.63mm | 5.00mm |
| 390017 | 2.7μm | 0.72 | 2.6mm | 1.50mm | 3.5mm | 1.24mm | 1.10mm |
| 390028 | 4.1μm | 0.56 | 7.6mm | 5.95mm | 8.0mm | 5.0mm | 2.50mm |
| 390029 | 4.2μm | 0.86 | 2.5mm | 0.91mm | 3.0mm | 0.66mm | 0.90mm |
| 390093 | 7.8μm | 0.71 | 5.0mm | 3.0mm | 6.5mm | 2.35mm | 2.62mm |
| 390010 | 9.2μm | 0.83 | 3.0mm | 1.47mm | 4.5mm | 0.63mm | 2.18mm |
| 390037 | 9.2μm | 0.85 | 4.0mm | 1.87mm | 5.5mm | 0.72mm | 3.00mm |

CONNECTORIZED ASPHERIC FIBER OPTIC COLLIMATORS

MOLDED ASPHERIC LENSES PRE-ALIGNED FOR USE WITH FIBER PATCH CORDS

LightPath's connectorized collimators are available with FC/PC, FC/APC, or SMA fiber optic connectors. Each collimator is individually aligned and tested for the specified wavelength, and will offer excellent performance throughout the entire range of their AR coatings. Standard design assemblies are available for our most popular lens types, but any asphere in our catalog can be mounted into a custom assembly of your choice. Please contact LightPath sales for more information.



For all Connectorized Collimators, Pointing Accuracy = 0.5° and Waist Position = Infinity
 Connectorized Collimators can also be ordered as an unaligned kit for custom wavelength alignment

| Part Number | Wavelength (nm) | Beam ϕ (mm)* | AR Coating | Thread ϕ | ϕ (mm) |
|------------------------------------|-----------------|-------------------|------------|---------------|-------------|
| 355110 - (FCPC/FCAPC/SMA) - 543 | 543 | 1.2 | A | M11 x 0.5-6g | 11 |
| 355110 - (FCPC/FCAPC/SMA) - 633 | 633 | 1.2 | B | M11 x 0.5-6g | 11 |
| 355110 - (FCPC/FCAPC/SMA) - 780 | 780 | 1.2 | B | M11 x 0.5-6g | 11 |
| 355110 - (FCPC/FCAPC/SMA) - 1064 | 1064 | 1.4 | C | M11 x 0.5-6g | 11 |
| 355110 - (FCPC/FCAPC/SMA) - 1310 | 1310 | 1.1 | C | M11 x 0.5-6g | 11 |
| 355110 - (FCPC/FCAPC/SMA) - 1550 | 1550 | 1.2 | C | M11 x 0.5-6g | 11 |
| 355110 - (FCPC/FCAPC/SMA) -Y - KIT | | | A, B, or C | M11 x 0.5-6g | 11 |
| 354220 - (FCPC/FCAPC/SMA) - 543 | 543 | 2.2 | A | M11 x 0.5-6g | 11 |
| 354220 - (FCPC/FCAPC/SMA) - 633 | 633 | 2.1 | B | M11 x 0.5-6g | 11 |
| 354220 - (FCPC/FCAPC/SMA) - 780 | 780 | 2.2 | B | M11 x 0.5-6g | 11 |
| 354220 - (FCPC/FCAPC/SMA) - 1064 | 1064 | 2.4 | C | M11 x 0.5-6g | 11 |
| 354220 - (FCPC/FCAPC/SMA) - 1310 | 1310 | 2.0 | C | M11 x 0.5-6g | 11 |
| 354220 - (FCPC/FCAPC/SMA) - 1550 | 1550 | 2.1 | C | M11 x 0.5-6g | 11 |
| 354220 - (FCPC/FCAPC/SMA) -Y - KIT | | | A, B, or C | M11 x 0.5-6g | 11 |
| 355230 - (FCPC/FCAPC/SMA) - 543 | 543 | 0.9 | A | M11 x 0.5-6g | 11 |
| 355230 - (FCPC/FCAPC/SMA) - 633 | 633 | 0.8 | B | M11 x 0.5-6g | 11 |
| 355230 - (FCPC/FCAPC/SMA) - 780 | 780 | 0.9 | B | M11 x 0.5-6g | 11 |
| 355230 - (FCPC/FCAPC/SMA) - 1064 | 1064 | 1.0 | C | M11 x 0.5-6g | 11 |
| 355230 - (FCPC/FCAPC/SMA) - 1310 | 1310 | 0.8 | C | M11 x 0.5-6g | 11 |
| 355230 - (FCPC/FCAPC/SMA) - 1550 | 1550 | 0.9 | C | M11 x 0.5-6g | 11 |
| 355230 - (FCPC/FCAPC/SMA) -Y KIT | | | A, B, or C | M11 x 0.5-6g | 11 |
| 354240 - (FCPC/FCAPC/SMA) - 543 | 543 | 1.6 | A | M12 x 0.5-6g | 12 |
| 354240 - (FCPC/FCAPC/SMA) - 633 | 633 | 1.5 | B | M12 x 0.5-6g | 12 |
| 354240 - (FCPC/FCAPC/SMA) - 780 | 780 | 1.6 | B | M12 x 0.5-6g | 12 |
| 354240 - (FCPC/FCAPC/SMA) - 1064 | 1064 | 1.8 | C | M12 x 0.5-6g | 12 |
| 354240 - (FCPC/FCAPC/SMA) - 1310 | 1310 | 1.5 | C | M12 x 0.5-6g | 12 |
| 354240 - (FCPC/FCAPC/SMA) - 1550 | 1550 | 1.5 | C | M12 x 0.5-6g | 12 |
| 354240 - (FCPC/FCAPC/SMA) -Y - KIT | | | A, B, or C | M12 x 0.5-6g | 12 |
| 354260 - (FCPC/FCAPC/SMA) - 543 | 543 | 3.0 | A | M11 x 0.5-6g | 11 |
| 354260 - (FCPC/FCAPC/SMA) - 633 | 633 | 2.8 | B | M11 x 0.5-6g | 11 |
| 354260 - (FCPC/FCAPC/SMA) - 780 | 780 | 3.1 | B | M11 x 0.5-6g | 11 |
| 354260 - (FCPC/FCAPC/SMA) - 1064 | 1064 | 3.3 | C | M11 x 0.5-6g | 11 |
| 354260 - (FCPC/FCAPC/SMA) - 1310 | 1310 | 2.8 | C | M11 x 0.5-6g | 11 |
| 354260 - (FCPC/FCAPC/SMA) - 1550 | 1550 | 2.9 | C | M11 x 0.5-6g | 11 |
| 354260 - (FCPC/FCAPC/SMA) -Y - KIT | | | A, B, or C | M11 x 0.5-6g | 11 |
| 357775 - (FCPC/FCAPC/SMA) - 405 | 405 | 0.7 | UVA | M11 x 0.5-6g | 11 |
| 357775 - (FCPC/FCAPC/SMA) -Y - KIT | | | UVA | M11 x 0.5-6g | 11 |

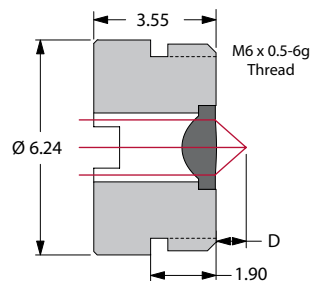
MOLDED ASPHERIC LENSES MOUNTED FOR EASY ASSEMBLY

| Part Number* | Holder Type | EFL (mm) | NA |
|---------------|-------------|----------|------|
| 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 | 0.43 |
| 355151Y-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 |

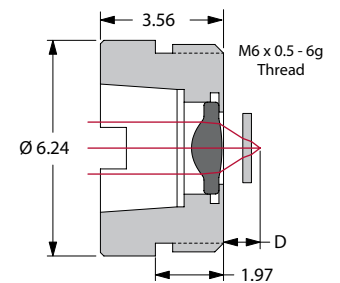


- Cost-effective solution for mounting Geltech aspheres
- Easy to handle assembly
- Durable stainless steel housing
- Threaded extension for easy mounting

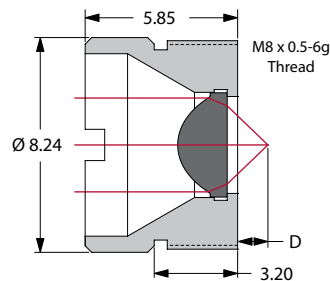
Lens Holder MT6A



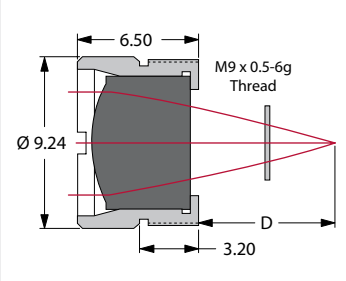
Lens Holder MT6B



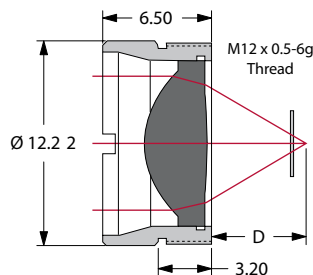
Lens Holder MT8



Lens Holder MT9



Lens Holder MT12



DID YOU KNOW?

There are a variety of custom coatings available.

* "Y" in the Part Number, is a placeholder for the coating type that the customer selects.

STANDARD GLASS TYPES

OPTIMUM PERFORMANCE WITH OPTIMUM LENSES

| Lens Code | Glass Type | Refractive Index, n_d | Abbé Number, v_d | CTE | dn/dT | Equivalent Glasses | RoHS Compliance |
|-----------|------------|-------------------------|--------------------|---|--|--|-----------------|
| 352xxx | ECO-550 | 1.603 | 50.02 | $11.62 \times 10^{-6}/^{\circ}\text{C}$ | $2.39 \times 10^{-6}/^{\circ}\text{C}$ | N/A | |
| 353xxx | H-FK61 | 1.495 | 81.20 | $13.8 \times 10^{-6}/^{\circ}\text{C}$ | $-6.6 \times 10^{-6}/^{\circ}\text{C}$ | Hoya-FCD1 & Ohara S-FPL51 | |
| 354xxx | D-ZK3 | 1.586 | 60.71 | $7.6 \times 10^{-6}/^{\circ}\text{C}$ | $3.2 \times 10^{-6}/^{\circ}\text{C}$ | Hoya M-BACD5N & Ohara L-BAL35 | |
| 355xxx | D-ZLaF52La | 1.806 | 40.79 | $6.9 \times 10^{-6}/^{\circ}\text{C}$ | $6.5 \times 10^{-6}/^{\circ}\text{C}$ | Ohara L-LAH53, Hoya M-NBFD130, Sumita K-VC89 | |
| 356xxx | L-LAL12 | 1.674 | 55.00 | $6.9 \times 10^{-6}/^{\circ}\text{C}$ | $6.5 \times 10^{-6}/^{\circ}\text{C}$ | CDGM D-Lak5 | |
| 357xxx | D-LaK6 | 1.690 | 52.65 | $6.9 \times 10^{-6}/^{\circ}\text{C}$ | $6.5 \times 10^{-6}/^{\circ}\text{C}$ | Hoya M-LAC130 & Ohara L-LAL13 | |

D-ZLaF52La → 355xxx Series of Lenses

This glass has a higher index of refraction than ECO-550 and is best suited for those applications that require a higher numerical aperture and need to maintain RoHS compliance.

D-ZK3 → 354xxx Series of Lenses

This glass is best suited for those applications that require a low cost glass for higher volume manufacturing.

ECO-550 → 352xxx Series of Lenses

ECO-550 is an environmentally friendly alternative to conventional moldable glasses.

D-LaK6 → 357xxx Series of Lenses

These glasses have been selected for their outstanding UV & Blue transmission properties.

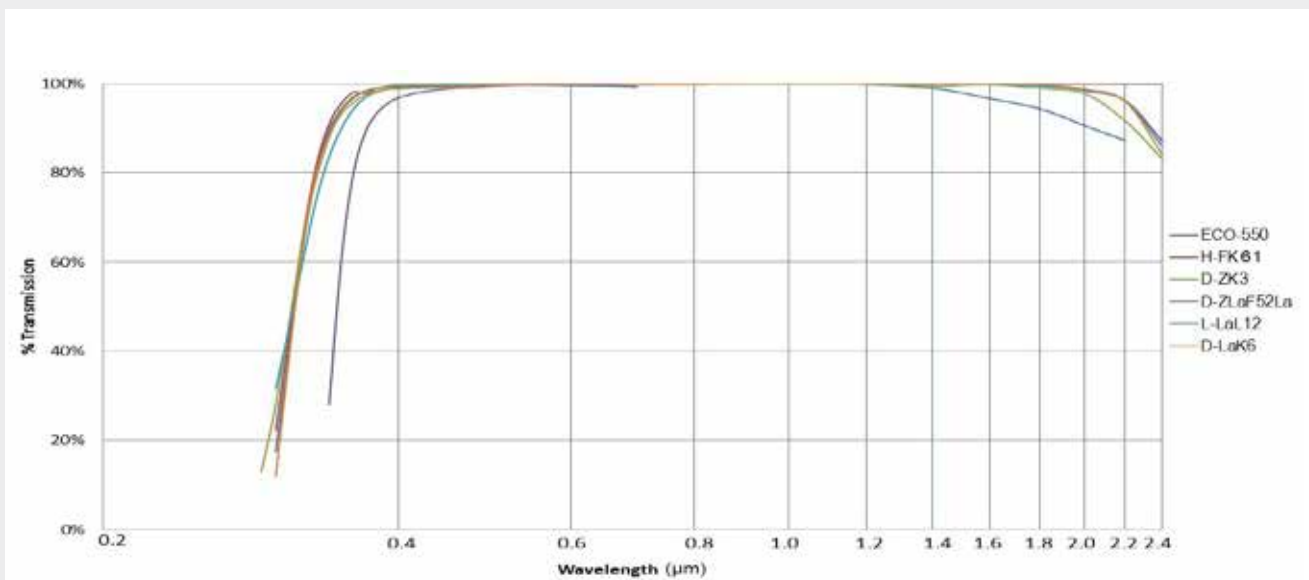
H-FK61 → 353xxx Series of Lenses

These glasses have been selected for their outstanding UV & Green transmission properties.

L-LAL12 → 356xxx Series of Lenses

SPECIALTY GLASS TYPES

There are well over 200 available moldable glass types. LightPath focuses on a select few types in order to provide our customers the fastest lead times at the lowest cost. Our standard selections meet most of our customers' needs but sometimes that special application requires a unique glass. LightPath can provide these glasses, starting with material qualification.



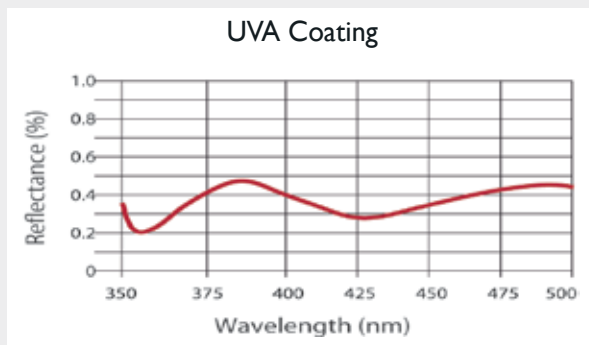
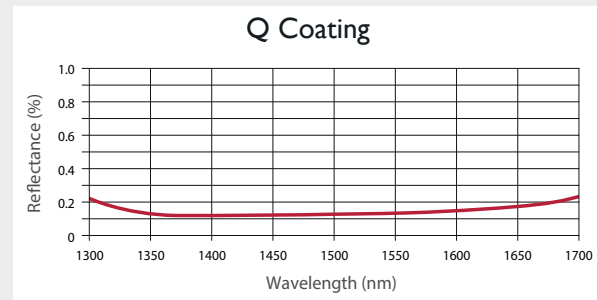
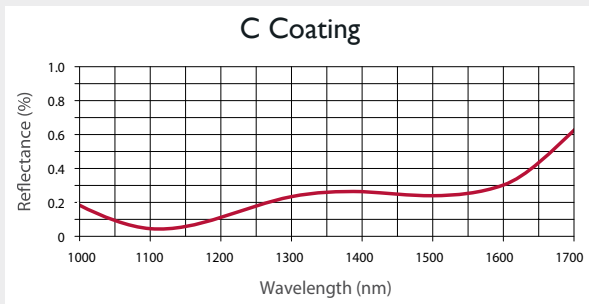
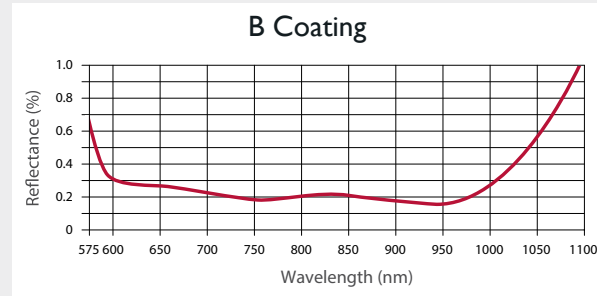
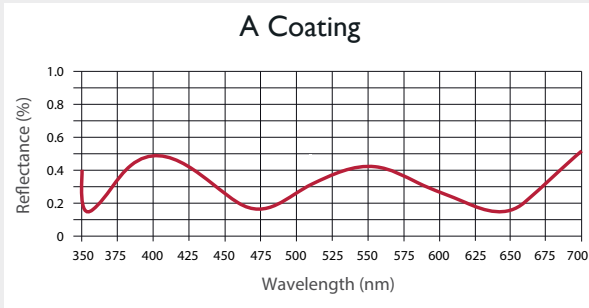
STANDARD ANTI-REFLECTIVE COATINGS

LightPath offers a variety of multilayer broadband coatings to reduce the back reflection from a nominal 6% for uncoated lenses. The choice of which AR coating is appropriate depends on the type of glass the lens is made from and the wavelength at which the lens will be used.

| Standard Coatings* | | | |
|--------------------------------|---------|----------------------|-----------------------|
| Lens Series | Coating | λ Range (nm) | Reflectivity |
| 352xxx, 353xxx, 354xxx, 355xxx | MLBB-A | 350 - 700 | $R_{avg} \leq 0.50\%$ |
| 352xxx, 354xxx, 355xxx | MLBB-B | 600 - 1050 | $R_{max} < 1.00\%$ |
| 352xxx, 354xxx, 355xxx | MLBB-C | 1050 - 1600 | $R_{max} < 1.00\%$ |
| 355xxx | MLBB-Q | 1300 - 1700 | $R_{max} < 0.25\%$ |
| 356xxx, 357xxx | UVA | 350 - 500 | $R_{max} < 1.00\%$ |

* LightPath's rigorous qualification process ensures all standard coatings will pass the abrasion and adhesion resistance requirements of ISO+9211-4-196.

Typical Coating Curves



Contact LightPath today for your custom quote

1.800.472.3486 or +1.407.382.4003

LightPath[®]

..... TECHNOLOGIES

2603 Challenger Tech Court
Suite 100
Orlando, Florida 32826, USA
Phone: +1.407.382.4003

24a Ganibu dambis, k-13
Riga, Latvia, LV-1005
Phone: (371) 67 323 779

40th Building, No. 99 Jing 15 RD
Dingmao, Zhenjiang New District
Jiangsu, 212009
China

www.lightpath.com