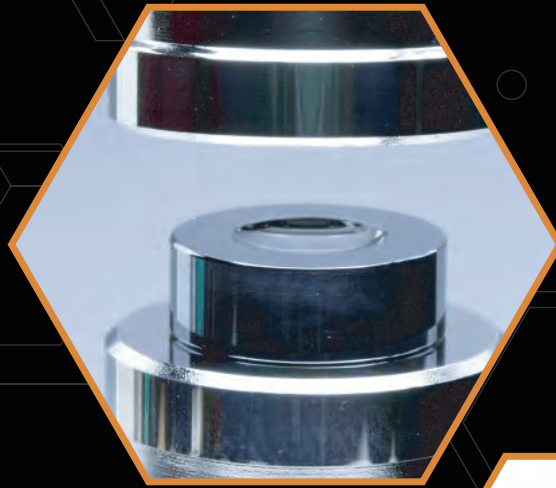


GLOBAL LEADER IN OPTICAL TECHNOLOGY

LightPath[®]

TECHNOLOGIES



Infrared Aspheric Lenses



www.lightpath.com.cn

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.





Thermal Imaging Lens Assmblies

04-06



IR Collimating Lenses

07-08

IR Collimating Lens Assemblies

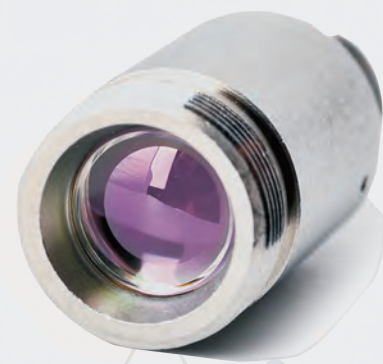
09

Standard Coatings

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General Specifications

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LEADERS IN CHALCOGENIDE GLASS MOLDING

- Moldable solution for high volume production of MWIR or LWIR lenses
- Reduced Cost, Size and Weight (SWaP-C)
- Enhanced thermal properties



Advances in chalcogenide materials have enabled precision glass molding for mid- and long-wave-length infrared (MWIR & LWIR) optics in a process similar to visible molded lenses. LightPath's Molded Infrared Optics technology enables the production of high performance, cost-effective infrared aspheric lenses that do not rely on traditional diamond turning or lengthy polishing methods.

The infrared optics molding process allows lenses to be manufactured in high volume with a highly repeatable, consistent performance.

Diffraction features can be added to infrared aspheres to allow for sophisticated beam shaping or achromatization over a range of wavelengths. With LightPath's technology, these features are molded directly into the surfaces of the lens.

LightPath is a pioneer in the development, design and manufacturing of infrared optics made from molded chalcogenide glass. Our high volume production experience brings expertise and knowledge to your project as quantities for infrared optics continue to grow. With over 35 years' experience in precision glass molding, over 10 years molding Chalcogenides and millions of lenses sold, LightPath provides a wealth of knowledge on high volume manufacturing of precision molded optics and can help you implement your high volume infrared application.

THERMAL IMAGING LENS ASSEMBLIES

STANDARD LENS ASSEMBLIES

LightPath's infrared lens assemblies are a cost effective replacement for traditional diamond turned infrared lenses. LightPath's molded lenses provide exceptional value for high volume applications and are coated and assembled into threaded housings.

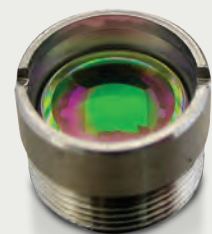
- Precision molded lenses using high-quality chalcogenide glass
- Passive athermalization optional for -40°C to +85°C
- High-volume, cost effective manufacturing
- Full design support for custom optics and mechanics from our experienced engineering team

Thermal Imaging Lens Assemblies					
Assembly Part Number	Lens Type	Effective Focal Length	F/#	Recommended Detector Format (H x V Resolution / Pixel Size)	Horizontal FOV (on Specific Detector)
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	320 x 240 / 17 µm	41°
7100320	Molded BD6™ Singlet	9 mm	1.3	320 x 240 / 17 µm	35°
7100340	Molded BD6™ Doublet	15 mm	1.2	640 x 512 / 10 µm	25°
7100350	Molded BD6™ Doublet	15 mm	1.0	384 x 288 / 17 µm	25°
7100338	Molded BD6™ Doublet	19 mm	1.1	640 x 480 / 17 µm	32°
7100341	Molded BD6™ Doublet	20 mm	1.2	640 x 512 / 10 µm	18°
7100346	Molded BD6™ Doublet	24 mm	1.2	640 x 480 / 17 µm	26°
7100412	DT / Molded BD6™ Hybrid	25 mm	1.0	640 x 480 / 17 µm	25°
7100383	DT / Molded BD6™ Hybrid	35 mm	1.0	640 x 480 / 17 µm	18°
7100353	DT / Molded BD6™ Hybrid	50 mm	1.2	640 x 480 / 17 µm	12°
7100406	Germanium	75 mm	1.0	640 x 480 / 17 µm	8°

/ Performance data for other detectors available upon request

DID YOU KNOW?

If you don't see the lens you need in our catalog, our engineering team will customize a solution for your specific application.



APPLICATIONS AND CAPABILITIES

Infrared systems have grown rapidly in recent years in a broad spectrum of applications including:

- Thermal imaging and thermography
- Gas sensing and spectroscopy
- Security and surveillance
- Automotive vision enhancement
- Manufacturing process control and inspection
- Target tracking and identification
- Weapon Sights
- Thermal Monocular and Binocular



These applications demand infrared systems that utilize only the highest quality and most precise optics. LightPath Technologies is taking the same revolutionary technology that made us a global leader in molded glass aspheres and applying it to infrared applications.



HIGH PERFORMANCE ASPHERES FOR LASER COLLIMATION IN THE INFRARED

- High numerical aperture for maximum collection efficiency
- Compact, single lens design
- Diffraction limited performance
- RoHS Compliant

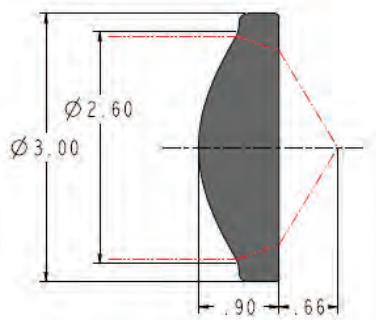
IR COLLIMATING LENSES can be used for applications such as collimation, focusing and coupling of quantum cascade lasers (QCL). These aspheric lenses are precision molded in IR glass for use in the short-wave, mid-wave and long-wave infrared (SWIR, MWIR, LWIR) bands.

Infrared collimating lenses can also be insert molded directly into metal housings, eliminating the need to use epoxy to assemble the lenses. Housing materials such as SS304L, SS316, AL6061, Inconel 718 and other materials are available. Molding into metal housings simplifies the mounting process while providing a hermetic seal between the lens and the rest of the package. Insert molding can improve optical centration, reduce part count and simplify assembly. LightPath can also manufacture your next level assembly.



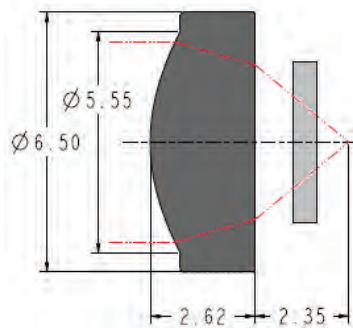
Contact us to discuss your custom assembly requirements

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



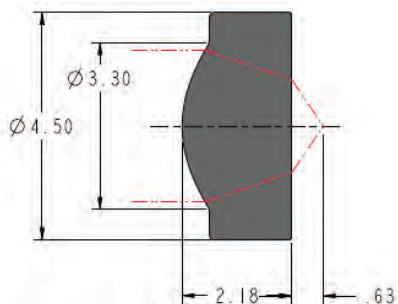
390029

Design Wavelength	4.2μm
Focal Length	0.91mm
Numerical Aperture	0.86
Clear Aperture	2.5mm



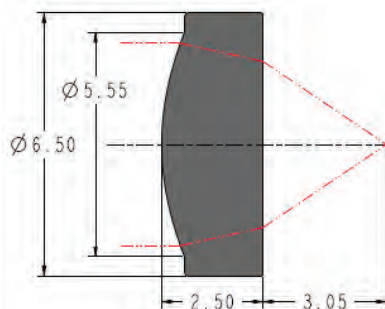
390093

Design Wavelength	7.8μm
Focal Length	3.0mm
Numerical Aperture	0.71
Clear Aperture	5.0mm



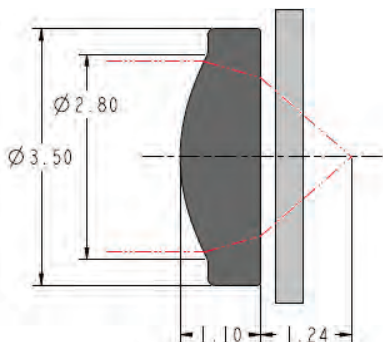
390010

Design Wavelength	9.2μm
Focal Length	1.47mm
Numerical Aperture	0.83
Clear Aperture	3.0mm



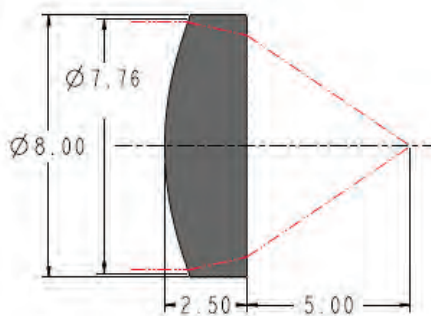
390036

Design Wavelength	4.1μm
Focal Length	4.0mm
Numerical Aperture	0.56
Clear Aperture	5.0mm



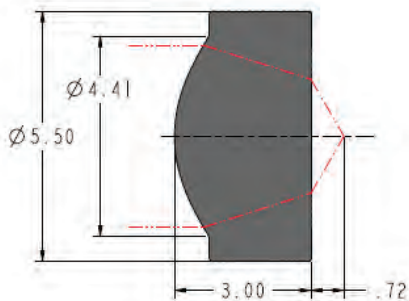
390017

Design Wavelength	2.7μm
Focal Length	1.50mm
Numerical Aperture	0.72
Clear Aperture	2.6mm



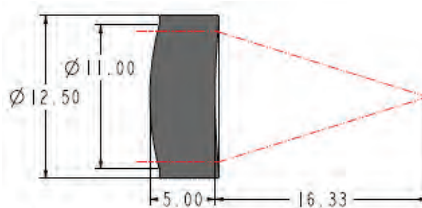
390028

Design Wavelength	4.1μm
Focal Length	5.95mm
Numerical Aperture	0.56
Clear Aperture	7.6mm



390037

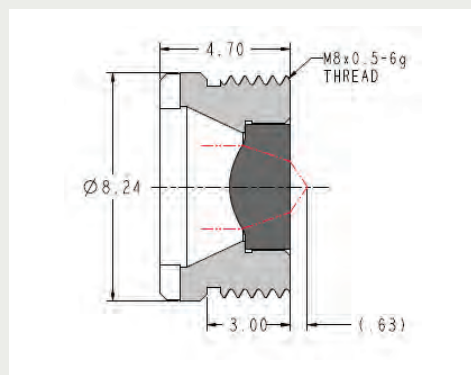
Design Wavelength	9.5μm
Focal Length	1.87mm
Numerical Aperture	0.85
Clear Aperture	4.0mm



390042

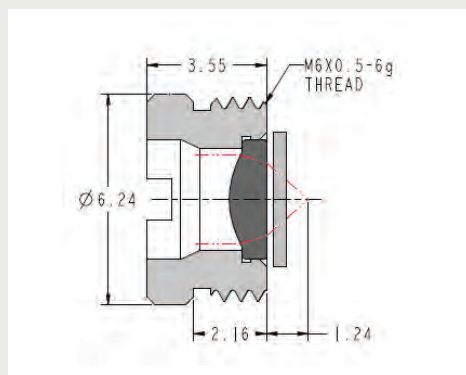
Design Wavelength	2.5μm
Focal Length	19.04mm
Numerical Aperture	0.23
Clear Aperture	10.0mm

HIGH PERFORMANCE ASPHERES FOR LASER COLLIMATION IN THE INFRARED



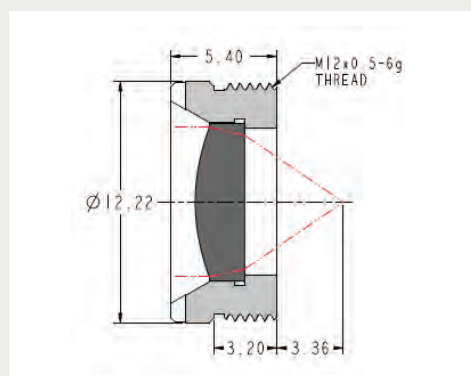
390010MT

Design Wavelength	9.2μm
Focal Length	1.47mm
Numerical Aperture	0.83
Clear Aperture	3.00mm



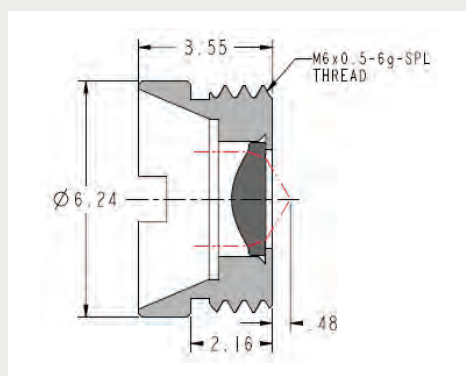
390017MT

Design Wavelength	2.3μm
Focal Length	1.500mm
Numerical Aperture	0.72
Clear Aperture	2.60mm



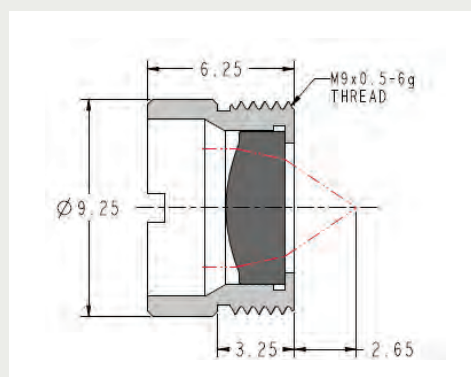
390028MT

Design Wavelength	4.1μm
Focal Length	5.95mm
Numerical Aperture	0.561
Clear Aperture	7.56mm



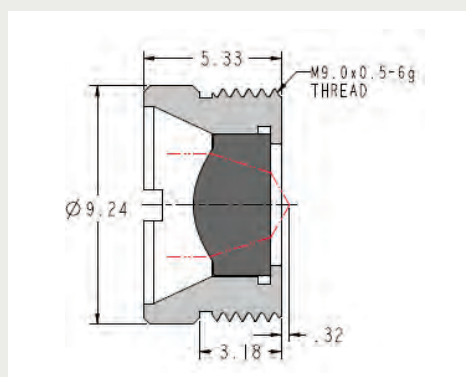
390029MT

Design Wavelength	4.2μm
Focal Length	0.91mm
Numerical Aperture	0.86
Clear Aperture	2.50mm



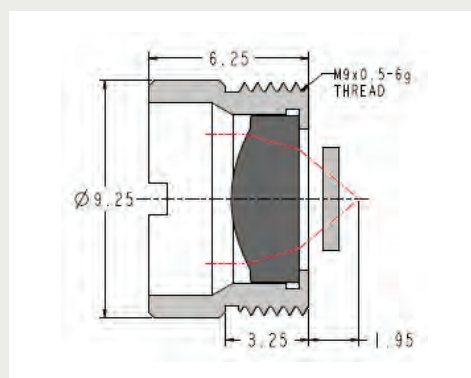
390036MT

Design Wavelength	2.5μm
Focal Length	4.000mm
Numerical Aperture	0.559
Clear Aperture	5.00mm



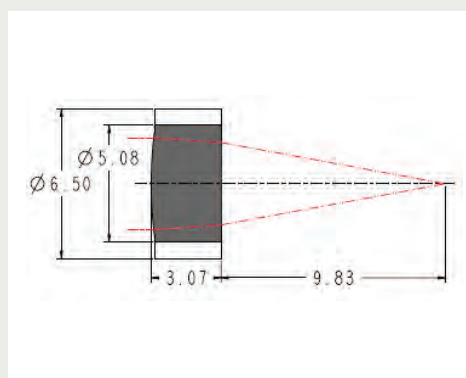
390037MT

Design Wavelength	9.5μm
Focal Length	1.87mm
Numerical Aperture	0.852
Clear Aperture	4.00mm



390093MT

Design Wavelength	7.8μm
Focal Length	3.00mm
Numerical Aperture	0.71
Clear Aperture	5.00mm



390121 Insert Molded

Design Wavelength	3.5μm
Focal Length	11mm
Numerical Aperture	0.18
Clear Aperture	4.00mm

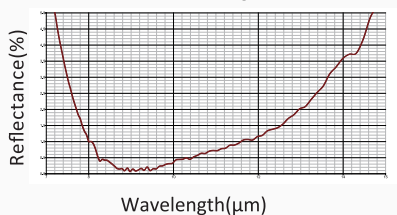
STANDARD COATINGS

Standard Coatings		
Range	Wavelength (μm)	R_{AVG}
LWIR	8 - 12	< 1.0% per side
MWIR	3 - 5	< 1.0% per side
SWIR	1.8 - 3	< 1.0% per side

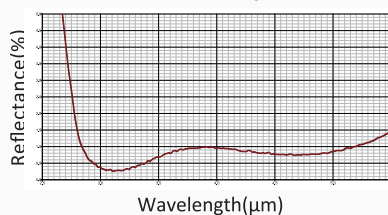
Available Coatings		
Coating	Wavelength (μm)	Reflectance
IR-1	7 - 14	$R_{\text{avg}} < 1.00\%$
IR-3	2 - 6	$R_{\text{avg}} < 0.60\%$
IR-4	1.75 - 3	$R_{\text{avg}} < 1.00\%$
IR-6	8 - 12	AR Side: $R_{\text{avg}} < 0.75\%$
IR-7	8 - 12	AR Side: $R_{\text{avg}} < 1.00\%$ DLC Side: $R_{\text{avg}} < 5.00\%$
IR-8	8 - 12	AR Side: $R_{\text{avg}} < 0.75\%$ HD Side: $R_{\text{avg}} < 0.75\%$
Coating	Wavelength (μm)	Transmittance
IR-6 SWB	2 - 5	$T_{\text{avg}} < 15\%$
	8 - 12	$T_{\text{avg}} > 95\%$

Typical Coating Curves

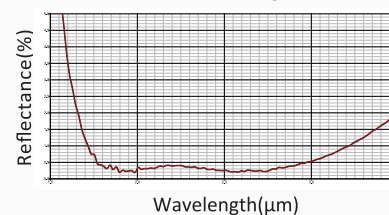
IR-1 Coating



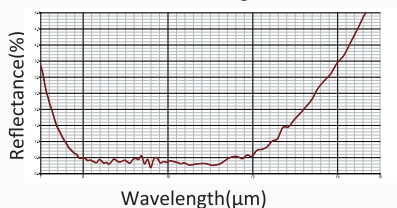
IR-3 Coating



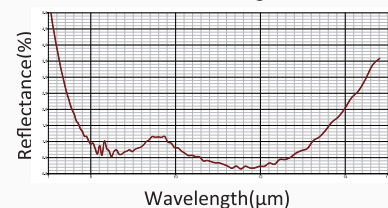
IR-4 Coating



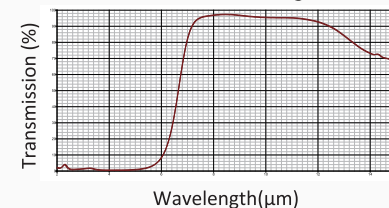
IR-6 Coating



IR-8 Coating



IR-6 SWB Coating



Custom coatings are available, contact your representative today to review your needs.

GENERAL SPECIFICATIONS

General Specifications and Tolerances

Holder Material	SUS304 / SF20F /SUS416
Holder Outer Diameter	+/- 0.025mm
Holder Inner Diameter	+/- 0.100mm
Holder Length	+/- 0.100mm
Length of Threaded Section	+/- 0.100mm



支持客户定制化 更多信息请联系我们

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