



RAYS OPTICS CO., LTD

YOUR OPTOELECTRONIC STRATEGIC PARTNER

RAYS OPTICS CO., LTD

Optical Design
Optical Manufacturing
Optical Coating
Optical Assembly
One-stop Optical Service

Custom and volume manufacturer
Optical and imaging components and systems



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RAYS OPTICS CO., LTD

COMPANY PROFILE



Rays optics co., ltd was established in 2013. It is professional optical components and laser accessories, as well as a high-tech industry engaged in the research, production and development of optical products.

A manufacturing company integrating R&D and sales, with more than 30 technical personnel who have been engaged in the optical filed for many years.

The company's products are mainly used in Life Science, Metrology, Laser Applications, Imaging and Display Aerospace Industry, Semiconductor, Safety and Security, Automotive, Industrial engineering, Research and Development.

Rays optics aims to manufacture optical components based on our clients' precise requirements. We are a one-stop shop for optics, covering design, prototyping, and volume production. We are optical technology partners for our customers.

Our advantage is that we can process a wide range of products with high precision, high production capacity, short production cycle, and large, medium and small lots. Our clients are leading optical companies in Germany, Switzerland, Italy, Israel, The UK and United States, etc. Nearly 99% of the manufactured goods are for export.



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OUR EQUIPMENTS

OPTICAL COMPONENTS



- Diameter: 10mm~200mm
- Surface Irregularity RMS: PV≥2um
- Available Materials: glass ceramic crystal
- Four-axis fine grinding and polishing machine



- Diameter: 0~260mm
- Surface Irregularity RMS: 0.1um, no need for alignment, quick change of probe
- Measuring speed: 0.02mm/S~10mm/s
- Satisloh Fine grinding machine SPM60



- Diameter: 10mm~500mm
- Purpose: polishing all kinds of glass material non-spherical mirror
- Zygo interferometer



- Diameter: 10mm~350mm
- Surface Irregularity RMS: up to RMS1/20λ wavelength above
- Applicable testing parts: lenses and mirrors of various materials



- Diameter: 5~250mm
- Surface Irregularity RMS: up to RMS1/30λ
- Available Materials: metal, crystal, plastic and other material lens



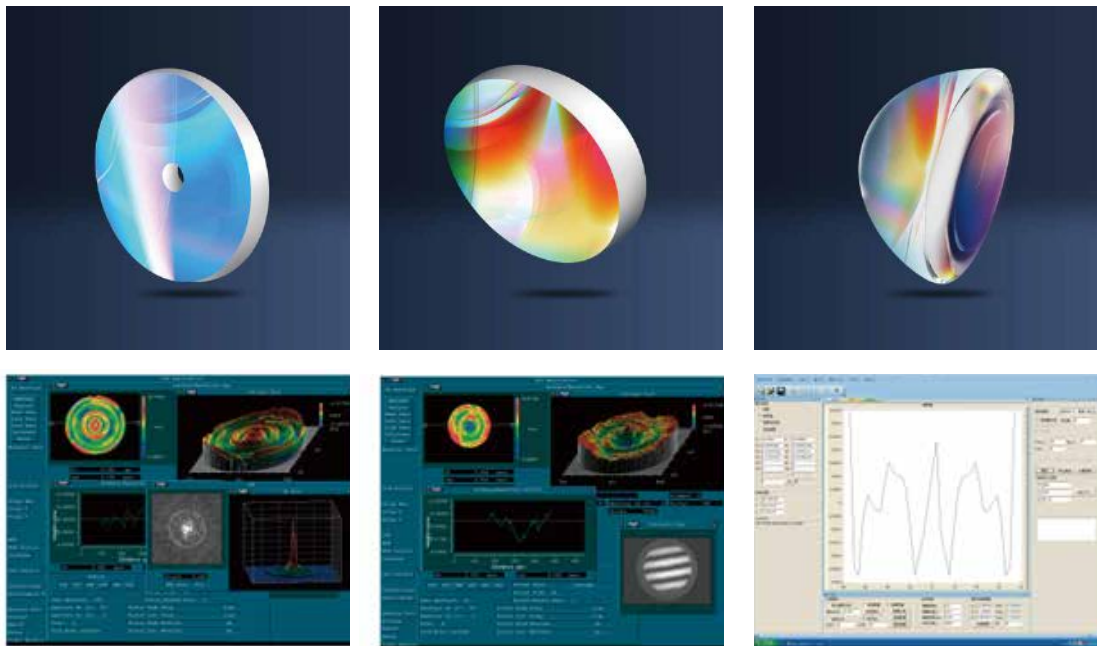
- AR coatings
- HR coatings
- Beam splitter coatings
- Dichroic coatings
- IR coatings
- Laser line filter
- UV coatings

1 Aspheric Lenses: Precision Polished & Molded

Aspheric lenses allow optical engineers to correct aberrations using fewer components than spherical optics since the former provides greater aberration correction than multiple surfaces of the latter. Given this, many spherical lenses may be replaced with smaller amounts of aspheric ones to achieve comparable or superior optical outcomes while reducing system size, simplifying the manufacturing procedure, and producing imaging lenses that are less expensive and outperform traditional spherical component assemblies.

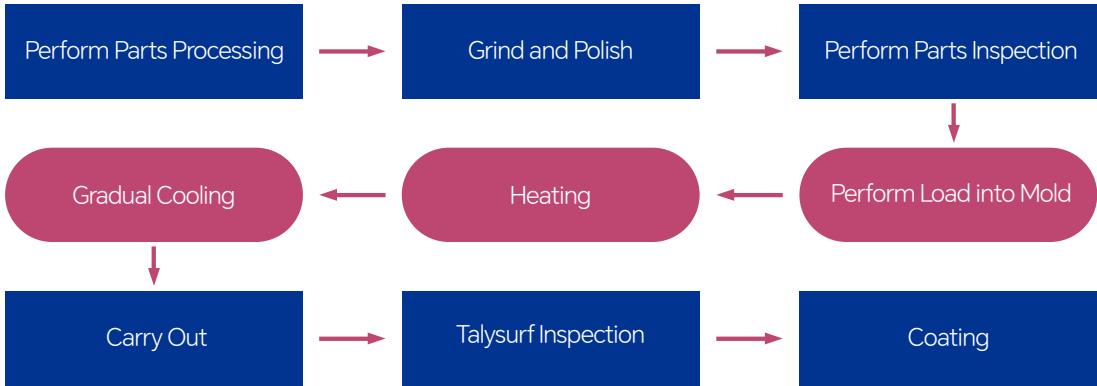
1. Diamond Turning
Material: Germanium, Silicon, Zinc Selenide, Zinc Sulfide
2. Grinding & Polishing
Material: Optical Glass (CDGM, Hoya, Ohara, Schott)
3. Precision Molding
Material: Low Temperature Optical Glass, Optical Plastics

Item	Capability	Tolerances
Outer Diameter	10mm~250mm	≥±0.10mm
Center Thickness	≥1mm	≥±0.10mm
Wedge(TIR)	>0.002mm	0.100mm
Asphericity(@50mm dia)	up to 5mm	<1mm
Surface Figure PV@633nm	λ/2	>1.5λ
Surface Figure RMS@633nm	0.05um	>0.2um
Roughness	0.5nm RMS	>2nm RMS
Surface Quality	/	40~20
Coating	Custom coatings are available upon request	



Precision glass moulding is a replicative process that allows the production of high-precision optical components from the glass without grinding and polishing. The process is also known as ultra-precision glass pressing. It is used to manufacture precision glass lenses for consumer products, and high-end products. The main advantage over mechanical lens production is that complex lens geometries such as aspheres can be producedcost efficiently.

MOLDING PROCESS



2 Sphere Lenses

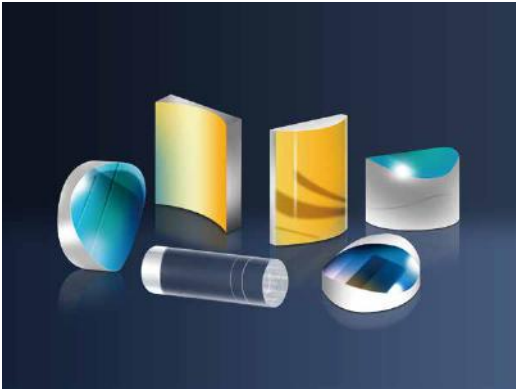


Material:	Optical glass, Fused silica, Silicon, CaF2, MgF2, Sapphire, ZnSe
Diameter:	0.3 to 500 mm
Diameter Tolerance:	±0.05 mm
Thickness Tolerance:	±0.05 mm

- Plano-Convex Lenses
- Plano-Concave Lenses
- Bi-Convex Lenses
- Bi-Concave Lenses
- Meniscus Lenses
- Achromatic Lenses
- Ball Lenses

Surface Quality:	10-5
Surface Figure:	λ/10
Centration:	1 minute or 30 Second
Coating:	Uncoated, AR and HR

3 Cylindrical Lenses



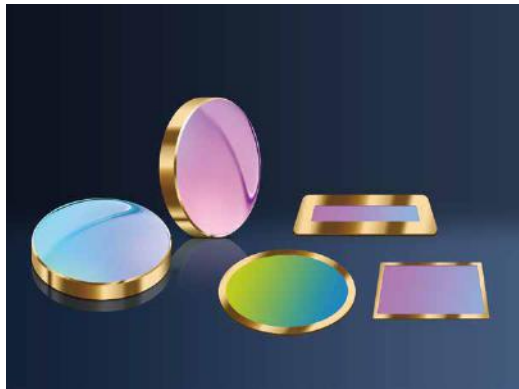
Diameter Tolerance:	±0.05 mm
Thickness Tolerance:	±0.05 mm
Surface Figure:	λ/4~ λ/2

- Powell Lenses
- Rod Lenses
- Plano-Concave Cylindrical Lenses
- Plano-Convex Cylindrical Lenses
- Cylindrical Achromatic Doublets
- Imaging Grade Cylindrical Lenses
- Laser Grade Cylindrical Lenses

Coating:	Uncoated, AR Coating
Surface Quality:	40-20



4 Windows



Suitable Solder Material:	AuSn, AuSi, AuGe, Sn
Substrate:	Sapphire, Silicon, Fused Silica, ZnSe, BK7, D263T

- Metallic Windows
- Sealing Windows
- Visible Windows
- UV and IR Windows
- Laser Windows
- Interferometry Windows
- Specialty Windows

Size:	$\phi 2 \sim \phi 100$; $1 \times 1 \sim 100 \times 100$
Coating:	According to the requirement

5 Filters

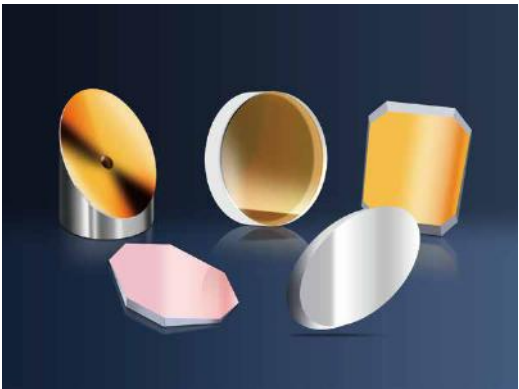


Material:	Optical glass and Fused silica
Diameter Tolerance:	± 0.05 mm
Thickness Tolerance:	± 0.05 mm
Surface Figure:	$\lambda/4$

- IR Filters
- UV Band Filters
- Visible Light Filters
- Notch Filters
- Bandpass Filters
- Dichroic Mirrors
- Narrowband Filters
- Neutral Density Filters

Surface Quality:	40~20
Parallelism:	< 3 minute
Coating:	According to the requirement

6 Mirrors



Material:	Optical glass and Fused silica
Diameter:	1 to 300 mm
Diameter Tolerance:	± 0.05 mm
Thickness Tolerance:	± 0.05 mm

- IR Mirrors
- Laser Line Mirrors
- Ultrafast Laser Mirrors
- Hot and Cold Mirrors
- Off-Axis Parabolic Mirrors
- Protected Aluminum Mirrors
- Metal-Coated Cylindrical Mirrors

Surface Quality:	20~10
Surface Figure:	$\lambda/10$
Parallelism:	1 minute
Coating:	Aluminum, Silver, Gold and Dielectric

7 Prisms

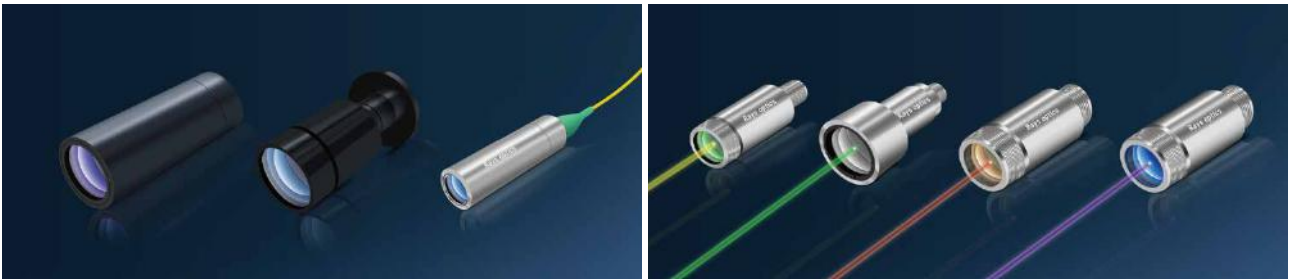


Material:	Optical glass, Fused silica, Silicon, Sapphire, ZnSe
Dimension:	1~250 mm
Diameter Tolerance:	± 0.05 mm
Thickness Tolerance:	± 0.05 mm

- Right Angle Prisms
- Dove Prisms
- Amici Prisms
- Rhomboid Prisms
- Cube Beamsplitters
- Corner Cube Retroreflectors
- Penta Prisms

Surface Flatness:	$\lambda/10 @ 632.8$ nm
Surface Quality:	10~5
Angular Accuracy:	5 Second
Coating:	Uncoated, AR, HR, Beamsplitter ect

LASER FIBER COLLIMATOR AND COUPLER



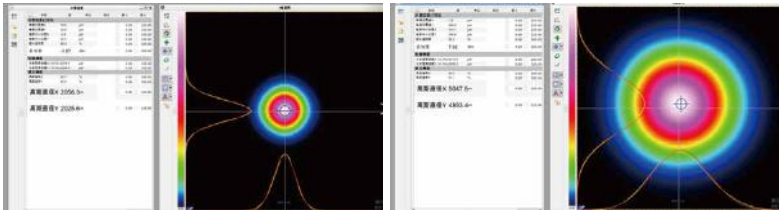
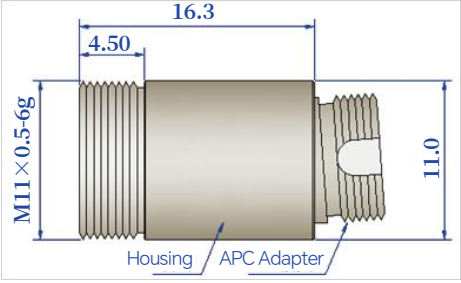
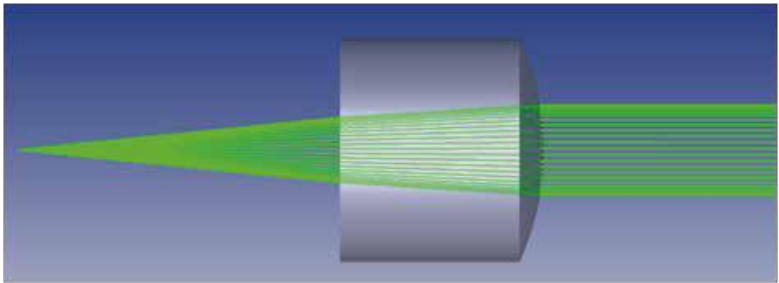
1. Aspheric Lenses Collimators

A fixed focal length is used because non-spherical lenses has a design that corrects for chromatic aberration and have good collimation of the light beam, resulting in a Gaussian distribution of energy in the output optical beam. The lens is double-sided and coated with anti-reflection films to minimize surface reflection. However, the effective focal length (EFL) of aspheric lenses is closely related to wavelength, resulting in chromatic aberration. The relative position of the lens and optical fiber is precisely adjusted to ensure that the angle of the output light is within 0.5°, and standard manufacturing processes are used to ensure product stability, consistency, and good compatibility.

780nm	±5nm	1.0mm	0.06°+0.01°	4.63mm	0.24	Φ11mm	780HP	FC/PC FC/APC Sma905	>95%
	±5nm	2.25mm	0.026°+0.01°	11.06mm	0.24	Φ11mm			
	±5nm	4.0mm	0.01°+0.01°	18.33mm	0.15	Φ11mm			
850nm	±5nm	1.0mm	0.06°+0.01°	4.64mm	0.24	Φ11mm			
	±5nm	2.3mm	0.03°+0.01°	11.10mm	0.24	Φ11mm			
	±5nm	3.99mm	0.02°+0.01°	18.45mm	0.15	Φ11mm			
980nm	±5nm	1.0mm	0.07°+0.01°	4.66mm	0.24	Φ11mm	980HP		
	±5nm	2.3mm	0.03°+0.01°	11.16mm	0.24	Φ11mm			
	±5nm	4.0mm	0.02°+0.01°	18.52mm	0.15	Φ11mm			
1064nm	±5nm	1.0mm	0.08°+0.01°	4.67mm	0.24	Φ11mm	HI1060		
	±5nm	2.3mm	0.032°+0.01°	11.18mm	0.24	Φ11mm			
	±5nm	4.05mm	0.02°+0.01°	18.58mm	0.15	Φ11mm			
1310nm	±5nm	0.84mm	0.11°+0.01°	4.70mm	0.24	Φ11mm	Smf-28e		
	±5nm	2.05mm	0.047°+0.01°	11.25mm	0.23	Φ11mm			
	±5nm	3.35mm	0.029°+0.01°	18.67mm	0.15	Φ11mm			
1550nm	±5nm	0.87mm	0.11°+0.01°	4.74mm	0.24	Φ11mm			
	±5nm	2.10mm	0.053°+0.01°	11.31mm	0.23	Φ11mm			
	±5nm	3.5mm	0.032°+0.01°	18.75mm	0.15	Φ11mm			
1650nm	±5nm	0.90mm	0.11°+0.01°	4.74mm	0.24	Φ11mm			
	±5nm	2.15mm	0.058°+0.01°	11.36mm	0.23	Φ11mm			
	±5nm	3.64mm	0.035°+0.01°	18.81mm	0.15	Φ11mm			

SINGLE-MODE FIBER

Wavelength	Bandwidth	Export beam Size	Divergence Angle	EFL	NA	Pakage Dia.	Fiber Type	Connector	Transmittance
405nm	±5nm	0.86mm	0.06°+0.01°	4.45mm	0.25	Φ11mm	405HP	FC/PC FC/APC Sma905	>95%
	±5nm	2.4mm	0.02°+0.01°	10.67mm	0.25	Φ11mm			
	±5nm	3.1mm	0.015°+0.01°	17.71mm	0.15	Φ11mm			
450nm	±5nm	0.82mm	0.05°+0.01°	4.50mm	0.25	Φ11mm			
	±5nm	2.2mm	0.02°+0.01°	10.77mm	0.24	Φ11mm			
	±5nm	3.0mm	0.015°+0.01°	17.88mm	0.15	Φ11mm			
520nm	±5nm	0.86mm	0.06°+0.01°	4.45mm	0.25	Φ11mm	460HP	>95%	
	±5nm	2.4mm	0.02°+0.01°	10.67mm	0.25	Φ11mm			
	±5nm	3.1mm	0.015°+0.01°	17.71mm	0.15	Φ11mm			
633nm	±5nm	0.86mm	0.05°+0.01°	4.59mm	0.24	Φ11mm	630HP		>95%
	±5nm	2.2mm	0.02°+0.01°	10.96mm	0.24	Φ11mm			
	±5nm	3.5mm	0.015°+0.01°	18.14mm	0.15	Φ11mm			



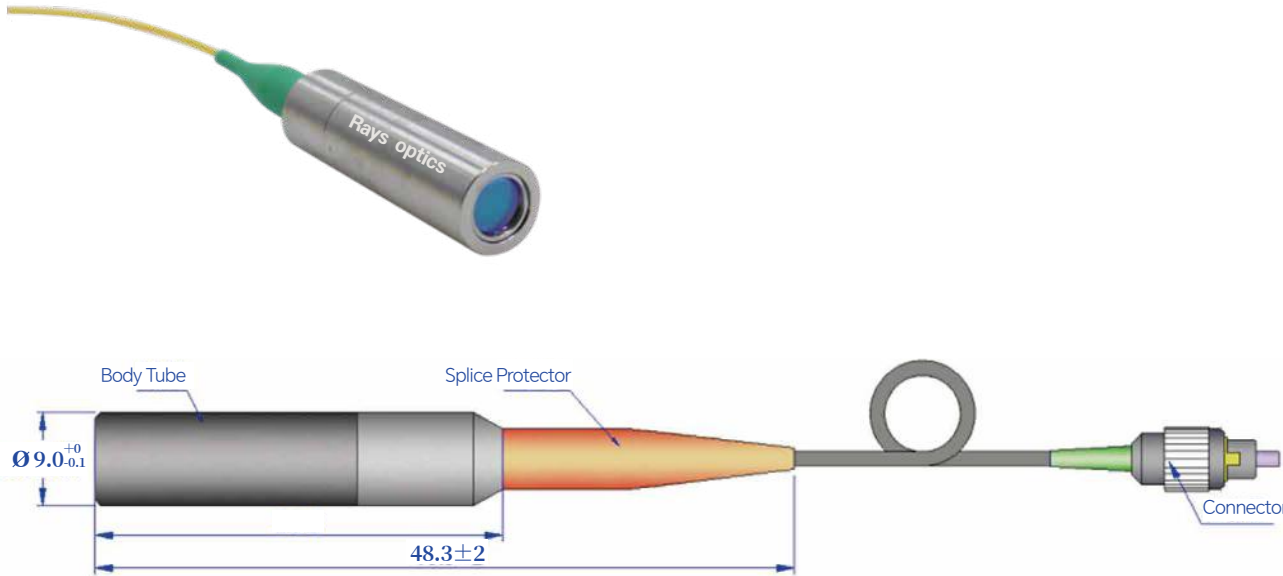
MULTIMODE FIBER

Wavelength	Bandwidth	Export beam Size	Divergence Angle	EFL	NA(Lens)	Pakage Dia.	Fiber Type	Connector	Transmittance
450nm	±5nm	5.7mm	5.9mrad	10.77mm	0.31	Φ11mm	62.5/125	FC/PC Sma905	>95%
	±5nm	4.7mm	18.8mrad	10.77mm	0.31	Φ11mm	200/220		
485nm	±5nm	4.7mm	9.9mrad	10.84mm	0.31	Φ11mm	62.5/125		
	±5nm	4.8mm	18.7mrad	10.84mm	0.31	Φ11mm	200/220		
	±5nm	4.8mm	37.6mrad	10.84mm	0.31	Φ11mm	400/440		
525nm	±5nm	5.8mm	6.0mrad	10.89mm	0.31	Φ11mm	62.5/125		
	±5nm	4.8mm	9.8mrad	10.89mm	0.31	Φ11mm	105/125		
	±5nm	4.8mm	18.7mrad	10.89mm	0.31	Φ11mm	200/220		
	±5nm	4.8mm	37.5mrad	10.89mm	0.31	Φ11mm	400/440		
635nm	±5nm	5.9mm	5.9mrad	11.0mm	0.31	Φ11mm	62.5/125		
	±5nm	4.8mm	9.7mrad	11.0mm	0.31	Φ11mm	105/125		
	±5nm	4.8mm	18.5mra	11.0mm	0.31	Φ11mm	200/220		
	±5nm	4.9mm	37.2mrad	11.0mm	0.31	Φ11mm	400/440		
780nm	±5nm	5.9mm	5.8mrad	11.09mm	0.30	Φ11mm	62.5/125		
	±5nm	4.9mm	9.7mrad	11.09mm	0.30	Φ11mm	105/125		
	±5nm	4.9mm	18.4mrad	11.09mm	0.30	Φ11mm	200/220		
	±5nm	4.9mm	37.0mrad	11.09mm	0.30	Φ11mm	400/440		
850nm	±5nm	6.0mm	6.0mrad	11.12mm	0.30	Φ11mm	62.5/125		
	±5nm	4.8mm	9.6mrad	11.12mm	0.30	Φ11mm	105/125		
	±5nm	4.8mm	18.4mrad	11.12mm	0.30	Φ11mm	200/220		
	±5nm	4.8mm	36.9mrad	11.12mm	0.30	Φ11mm	400/440		
905nm	±5nm	4.8mm	9.6mrad	11.14mm	0.30	Φ11mm	105/125		
	±5nm	4.8mm	18.4mrad	11.14mm	0.30	Φ11mm	200/220		
1064nm	±5nm	6.0mm	5.8mrad	11.19mm	0.30	Φ11mm	62.5/125		
	±5nm	4.9mm	9.6mrad	11.19mm	0.30	Φ11mm	105/125		
	±5nm	4.9mm	18.3mrad	11.19mm	0.30	Φ11mm	200/220		
	±5nm	4.9mm	36.6mrad	11.19mm	0.30	Φ11mm	400/440		
1310nm	±5nm	6.0mm	5.7mrad	11.26mm	0.30	Φ11mm	62.5/125		
	±5nm	4.9mm	9.5mrad	11.26mm	0.30	Φ11mm	105/125		
	±5nm	4.9mm	18.2mrad	11.26mm	0.30	Φ11mm	200/220		
	±5nm	4.9mm	36.5mrad	11.26mm	0.30	Φ11mm	400/440		
1550nm	±5nm	6.0mm	5.7mrad	11.32mm	0.30	Φ11mm	62.5/125		
	±5nm	4.9mm	9.5mrad	11.32mm	0.30	Φ11mm	105/125		
	±5nm	4.9mm	18.1mrad	11.32mm	0.30	Φ11mm	200/220		
	±5nm	5.0mm	36.3mrad	11.32mm	0.30	Φ11mm	400/440		

- All testing data for beam size and divergence angle are obtained by connecting the standard jumpers from Rays optics.
- Also applicable for polarization maintaining fiber with corresponding wavelength.
- Non-magnetic material housing (NUSPEEK-1000) can be customized.

2. Aspheric Lenses Collimators with Fiber

Using a compact structural design with tilted end fibers and aspheric lenses that have been accurately adjusted, the output Gaussian beam quality and excellent collimation characteristics are ensured. The lenses and fiber surfaces are coated with anti-reflection films, greatly reducing the back reflection of the output end face and lowering optical link noise. The long-focus collimator uses a bending housing to correct the output angle caused by the tilted end fibers, while the short-focus collimator uses a straight-through housing where the angle of the output light caused by the tilted end fibers can be ignored.

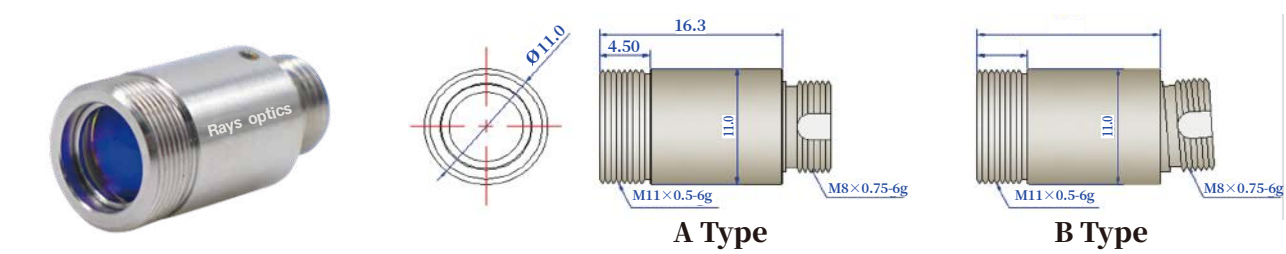


Wavelength	Bandwidth	Waist Beam Size	Divergence Angle	NA	EFL	Pakage Dia.	Fiber Type	Connector	Transmittance
405nm	±5nm	0.85mm	0.06°+0.01°	0.25	4.45mm	Φ9.0mm	405HP	FC/PC FC/APC Sma905	>90%
	±5nm	2.01mm	0.02° +0.01°	0.25	10.67mm	Φ9.0mm			
	±5nm	3.6mm	0.015° +0.01°	0.15	17.71mm	Φ9.0mm			
450nm	±5nm	0.82mm	0.05°+0.01°	0.25	4.50mm	Φ9.0mm	460HP		
	±5nm	2.0mm	0.02° +0.01°	0.24	10.77mm	Φ9.0mm			
	±5nm	3.0mm	0.015° +0.01°	0.15	17.88mm	Φ9.0mm			
525nm	±5nm	0.84mm	0.05°+0.01°	0.25	4.55mm	Φ9.0mm			
	±5nm	2.1mm	0.02° +0.01°	0.24	10.87mm	Φ9.0mm			
	±5nm	3.2mm	0.015° +0.01°	0.15	18.02mm	Φ9.0mm			
635nm	±5nm	0.86mm	0.05°+0.01°	0.24	4.59mm	Φ9.0mm	630HP		
	±5nm	2.06mm	0.02° +0.01°	0.24	10.96mm	Φ9.0mm			
	±5nm	3.5mm	0.015° +0.01°	0.15	18.14mm	Φ9.0mm			
780nm	±5nm	1.0mm	0.06°+0.01°	0.24	4.63mm	Φ9.0mm	780HP		
	±5nm	2.4mm	0.026° +0.01°	0.24	11.06mm	Φ9.0mm			
	±5nm	4.0mm	0.01° +0.01°	0.15	18.33mm	Φ9.0mm			
850nm	±5nm	1.0mm	0.06°+0.01°	0.24	4.64mm	Φ9.0mm	780HP		
	±5nm	2.41mm	0.03° +0.01°	0.24	11.10mm	Φ9.0mm			
	±5nm	3.9mm	0.02° +0.01°	0.15	18.45mm	Φ9.0mm			
980nm	±5nm	1.0mm	0.07°+0.01°	0.24	4.66mm	Φ9.0mm	980HP		
	±5nm	2.4mm	0.03° +0.01°	0.24	11.16mm	Φ9.0mm			
	±5nm	4.0mm	0.02° +0.01°	0.15	18.52mm	Φ9.0mm			
1064nm	±5nm	1.0mm	0.08°+0.01°	0.24	4.67mm	Φ9.0mm	980HP		
	±5nm	2.4mm	0.032° +0.01°	0.24	11.18mm	Φ9.0mm			
	±5nm	4.05mm	0.02° +0.01°	0.15	18.58mm	Φ9.0mm			
1310nm	±5nm	0.84mm	0.11°+0.01°	0.24	4.70mm	Φ9.0mm	Smf-28e		
	±5nm	2.04mm	0.047° +0.01°	0.23	11.25mm	Φ9.0mm			
	±5nm	3.35mm	0.029° +0.01°	0.15	18.67mm	Φ9.0mm			
1550nm	±5nm	0.87mm	0.11°+0.01°	0.24	4.74mm	Φ9.0mm	Smf-28e		
	±5nm	2.01mm	0.053° +0.01°	0.23	11.31mm	Φ9.0mm			
	±5nm	3.5mm	0.032° +0.01°	0.15	18.75mm	Φ9.0mm			

- Waist beam size: calculated using the theory of single-mode optical fiber for each wavelength, taken at the 1/e2 intensity point of the Gaussian beam.
- Far-field divergence angle of the beam: calculated according to the Gaussian beam 1/e2 theory.

3. Single-mode Fiber Achromatic Lenses Collimators

It consists of a group of long focal length collimating optical systems with chromatic aberration and distortion compensation design, making the focal length of the collimator insensitive to wavelength bandwidth. The divergent light beam emitted from the optical fiber, providing a good collimating effect and beam shape within a certain distance range. The optical surfaces of the lens group are coated with anti-reflection film to minimize surface reflection. The relative position of the lens and fiber is precisely adjusted to ensure that the deviation angle of the emitted light is within 0.3°, and standardized manufacturing processes ensure stable consistency of the product.



Wavelength	Bandwidth	Export beam Size	Divergence Angle	EFL	NA	Pakage Dia.	Fiber Type	Connector	Transmittance		
405nm	±30nm	0.97mm	0.062+0.01°	4.06mm	0.61	Φ11mm	405HP	FC/PC FC/APC Sma905	>95%		
	±30nm	2.1mm	0.03+0.01°	10.05mm	0.37	Φ11mm					
	±30nm	3.7mm	0.021+0.01°	15.96mm	0.25	Φ11mm					
	±30nm	4.9mm	0.015+0.01°	19.95mm	0.20	Φ11mm					
450nm	±30nm	0.96mm	0.06+0.01°	4.10mm	0.60	Φ11mm	460HP				
	±30nm	2.1mm	0.028+0.01°	10.07mm	0.37	Φ11mm					
	±30nm	3.6mm	0.020+0.01°	15.98mm	0.25	Φ11mm					
	±30nm	4.7mm	0.014+0.01°	19.96mm	0.20	Φ11mm					
525nm	±30nm	0.92mm	0.059+0.01°	4.15mm	0.60	Φ11mm	460HP				
	±30nm	2.04mm	0.025+0.01°	10.09mm	0.37	Φ11mm					
	±30nm	3.2mm	0.019+0.01°	15.98mm	0.25	Φ11mm					
	±30nm	4.3mm	0.014+0.01°	19.97mm	0.20	Φ11mm					
635nm	±30nm	0.87mm	0.056+0.01°	4.20mm	0.58	Φ11mm	630HP				
	±30nm	2.0mm	0.024+0.01°	10.13mm	0.37	Φ11mm					
	±30nm	3.12mm	0.019+0.01°	16.01mm	0.25	Φ11mm					
	±30nm	3.95mm	0.014+0.01°	20mm	0.20	Φ11mm					
780nm	±30nm	1.95mm	0.031+0.01°	10.04mm	0.37	Φ11mm	780HP				
	±30nm	3.49mm	0.020+0.01°	16.0mm	0.24	Φ11mm					
	±30nm	4.4mm	0.015+0.01°	20.03mm	0.20	Φ11mm					
850nm	±30nm	2.0mm	0.030+0.01°	10.05mm	0.37	Φ11mm					
	±30nm	3.47mm	0.020+0.01°	16.01mm	0.24	Φ11mm					
	±30nm	4.33mm	0.016+0.01°	20.03mm	0.20	Φ11mm					



Wavelength	Bandwidth	Waist Beam	Divergence Angle	EFL	NA	Pakage Dia.	Fiber Type	Connector	Transmittance
980nm	600~1050nm	1.95mm	0.035+0.01°	10.07mm	0.37	Φ11mm	980HP	FC/PC FC/APC Sma905	>95%
	600~1050nm	3.39mm	0.024+0.01°	16.03mm	0.24	Φ11mm			
	600~1050nm	4.23mm	0.018+0.01°	20.05mm	0.20	Φ11mm			
1064nm	1050~1700nm	1.9mm	0.038+0.01°	10.03mm	0.37	Φ11mm	HI1060		
	1050~1700nm	3.51mm	0.032+0.01°	15.97mm	0.24	Φ11mm			
	1050~1700nm	4.39mm	0.026+0.01°	19.97mm	0.20	Φ11mm			
1310nm	1050~1700nm	1.85mm	0.053+0.01°	10.07mm	0.37	Φ11mm	Smf-28e		
	1050~1700nm	2.91mm	0.036+0.01°	16.01mm	0.24	Φ11mm			
	1050~1700nm	3.62mm	0.028+0.01°	20.0mm	0.20	Φ11mm			
1550nm	1050~1700nm	1.85mm	0.06+0.01°	10.11mm	0.37	Φ11mm			
	1050~1700nm	3.14mm	0.039+0.01°	16.08mm	0.24	Φ11mm			
	1050~1700nm	3.92mm	0.031+0.01°	20.07mm	0.20	Φ11mm			
1654nm	1050~1700nm	2.05mm	0.06+0.01°	10.14mm	0.37	Φ11mm			
	1050~1700nm	3.2mm	0.036+0.01°	16.15mm	0.24	Φ11mm			
	1050~1700nm	3.98mm	0.029+0.01°	20.12mm	0.20	Φ11mm			

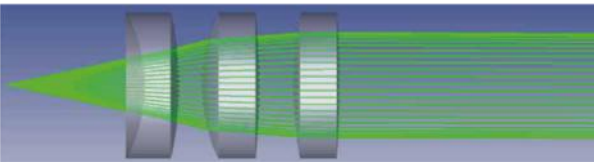
Non-magnetic Material Aspheric Lenses Polarization-Maintaining Collimators with Fiber

The housing material uses NJSSPEEK-1000 pure resin material, with a density of 1.3g/cm3, a bending strength of 165MPa, and a thermal deformation temperature of 152°C. It is suitable for beam collimation and coupling optical paths in strong electromagnetic environments.

Wavelength	Bandwidth	Waist Beam Size	Divergence Angle	ER	EFL	Pakage Dia.	Fiber Type	Connector	Transmittance
633nm	±5nm	2.0mm	0.40mrad	18	10mm	5mm	PM630-HP	FC/APC	>90%
	±5nm	3.0mm	0.27mrad	18	14mm	5mm			
	±5nm	4.45mm	0.18mrad	18	22mm	10mm			
780nm	±5nm	2.0mm	0.50mrad	20	10mm	5mm	PM780-HP		
	±5nm	2.6mm	0.38mrad	20	14mm	5mm			
	±5nm	4.35mm	0.23mrad	20	22mm	10mm			
850nm	±5nm	2.1mm	0.50mrad	20	10mm	5mm			
	±5nm	2.8mm	0.39mrad	20	14mm	5mm			
	±5nm	4.6mm	0.24mrad	20	22mm	10mm			

4. Multimode Fiber Achromatic Lenses Collimators

Multimode Fiber Achromatic Lenses Collimators are composed kits of high numerical aperture lenses, suitable for NA.22 multimode fibers. It can shape and collimate the light beam emitted from multimode fibers, as well as efficiently couple spatial light into multimode fibers. The optical design includes chromatic aberration and image aberration correction, making the collimator focal length insensitive to wavelength bandwidth. Each optical surface of the lens system is coated with anti-reflection film to minimize surface reflection.



Wavelength	Bandwidth	Waist Beam	Divergence Angle	EFL	NA(Lens)	Pakage Dia.	Fiber Type	Connector	Transmittance
450nm	±30nm	5.4mm	7.5mrad	10.09mm	0.37	Φ11mm	62.5/125 NA0.27	FC/PC Sma905	>92%
		12.5mm	4.3mrad	25.0mm	0.25	Φ15mm	200/220 NA0.22		
		4.4mm	21.0mrad	10.09mm	0.37	Φ11mm	400/440 NA0.22		
		12.1mm	8.8mrad	25.0mm	0.25	Φ15mm			
		4.4mm	41.0mrad	10.09mm	0.37	Φ11mm			
485nm	±30nm	12.1mm	16.7mrad	25.0mm	0.25	Φ15mm			
		4.4mm	11.2mrad	10.1mm	0.37	Φ11mm	105/125 NA0.22		
		11.5mm	4.9mrad	25.0mm	0.25	Φ15mm			
		4.4mm	21.1mrad	10.1mm	0.37	Φ11mm	200/220NA0.22		
		11.5mm	8.8mrad	25.0mm	0.25	Φ15mm			
525nm	400~700nm	7.5mm	28.4mrad	10.1mm	0.37	Φ11mm	200/230NA0.37		
		5.4mm	8.0mrad	10.11mm	0.37	Φ11mm	62.5/125 NA0.27		
		12.5mm	3.9mrad	25.02mm	0.25	Φ15mm			
		4.4mm	11.2mrad	10.11mm	0.37	Φ11mm	105/125NA0.22		
		11.4mm	4.8mrad	25.02mm	0.25	Φ15mm			
		4.4mm	21.2mrad	10.11mm	0.37	Φ11mm	200/220NA0.22		
		11.3mm	8.6mrad	25.02mm	0.25	Φ15mm			
		4.4mm	41.2mrad	10.11mm	0.37	Φ11mm	400/440NA0.22		
635nm	400~700nm	11.3mm	16.5mrad	25.02mm	0.25	Φ15mm			
		5.4mm	8.4mrad	10.14mm	0.37	Φ11mm	62.5/125 NA0.27		
		12.5mm	3.8mrad	25.07mm	0.25	Φ15mm			
		4.4mm	11.4mrad	10.14mm	0.37	Φ11mm	105/125NA0.22		
		11.2mm	4.7mrad	25.07mm	0.37	Φ15mm			
		4.4mm	21.3mrad	10.14mm	0.25	Φ11mm	200/220NA0.22		
		11.2mm	8.5mrad	25.07mm	0.25	Φ15mm			
		4.4mm	41.3mrad	10.14mm	0.37	Φ11mm	400/440NA0.22		
		11.2mm	16.4mrad	25.07mm	0.25	Φ15mm			



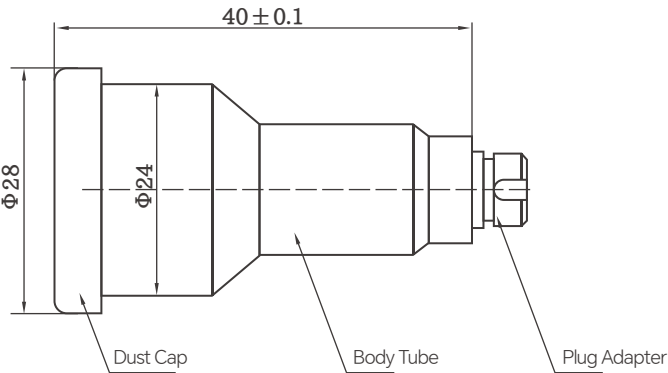
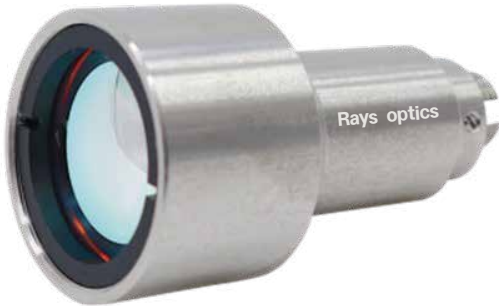
780nm	600~1050nm	5.4mm	8.3mrad	10.04mm	0.37	Φ11mm	62.5/125 NA0.27	FC/PC Sma905	>92%
		12.5mm	4.9mrad	24.97mm	0.25	Φ15mm			
		4.4mm	11.5mrad	10.04mm	0.37	Φ11mm	105/125 NA0.22		
		11.0mm	4.5mrad	24.97mm	0.25	Φ15mm			
		4.4mm	21.4mrad	10.04mm	0.37	Φ11mm	200/220 NA0.22		
		11.0mm	8.4mrad	24.97mm	0.25	Φ15mm			
850nm	600~1050nm	5.4mm	8.4mrad	10.05mm	0.37	Φ11mm	62.5/125 NA0.27		
		12.5mm	4.8mrad	24.98mm	0.25	Φ15mm			
		4.4mm	11.5mrad	10.05mm	0.37	Φ11mm	105/125NA0.22		
		10.9mm	4.5mrad	24.98mm	0.25	Φ15mm			
		4.4mm	21.5mrad	10.05mm	0.37	Φ11mm	200/220NA0.22		
		10.9mm	8.4mrad	24.98mm	0.25	Φ15mm			
		4.4mm	41.5mrad	10.05mm	0.37	Φ11mm	400/440NA0.22		
		10.9mm	16.5mrad	24.98mm	0.25	Φ15mm			
905nm	600~1050nm	4.4mm	11.5mrad	10.06mm	0.37	Φ11mm	105/125NA0.22		
		4.4mm	21.5mrad	10.06mm	0.37	Φ11mm	200/220NA0.22		
1064nm	1050~1700nm	5.4mm	7.7mrad	10.03mm	0.37	Φ11mm	62.5/125 NA0.27		
		12.5mm	4.9mrad	24.94mm	0.25	Φ15mm			
		5.4mm	11.3mrad	10.03mm	0.37	Φ11mm	105/125NA0.22		
		10.7mm	5.0mrad	24.94mm	0.25	Φ15mm			
		4.4mm	21.3mrad	10.03mm	0.37	Φ11mm	200/220NA0.22		
		10.7mm	9.2mrad	24.94mm	0.25	Φ15mm			
		4.4mm	41.3mrad	10.03mm	0.37	Φ11mm	400/440NA0.22		
		10.7mm	17.8mrad	24.94mm	0.25	Φ15mm			
1310nm	1050~1700nm	5.4mm	7.8mrad	10.07mm	0.37	Φ11mm	62.5/125 NA0.27		
		12.5mm	5.3mrad	25.01mm	0.25	Φ15mm			
		4.4mm	11.2mrad	10.07mm	0.37	Φ11mm	105/125NA0.22		
		10.6mm	5.12mrad	25.01mm	0.25	Φ15mm			
		4.4mm	21.2mrad	10.07mm	0.37	Φ11mm	200/220NA0.22		
		10.7mm	9.2mrad	25.01mm	0.25	Φ15mm			
		4.4mm	41.2mrad	10.07mm	0.37	Φ11mm	400/440NA0.22		
		10.7mm	17.8mrad	25.01mm	0.25	Φ15mm			
1550nm	1050~1700nm	5.4mm	7.8mrad	10.11mm	0.37	Φ11mm	62.5/125 NA0.27		
		12.5mm	5.8mrad	25.1mm	0.25	Φ15mm			
		4.4mm	11.7mrad	10.11mm	0.37	Φ11mm	105/125 NA0.22		
		10.7mm	5.0mrad	25.1mm	0.25	Φ15mm			
		4.4mm	21.2mrad	10.11mm	0.37	Φ11mm	200/220 NA0.22		
		10.7mm	9.1mrad	25.1mm	0.25	Φ15mm			
		4.4mm	41.1mrad	10.11mm	0.37	Φ11mm	400/440NA0.22		
		10.7mm	17.6mrad	25.1mm	0.25	Φ15mm			

• All testing data for beam size and divergence angle are obtained by connecting the standard jumpers from Rays optics.

5. Large Beam Collimators

By using an air gap bonded lens, it can provide better beam quality than aspherical lenses and achromatic lenses in terms of collimation performance.

The design of a low-aberration lens group can achieve a beam closer to a Gaussian beam, with a smaller divergence angles and smaller wavefront errors.



SM LARGE BEAM COLLIMATORS

Wavelength	Bandwidth	Waist Beam	Divergence Angle	EFL	NA(Lens)	Pakage Dia.	Fiber Type	Connector	Transmittance
405nm	±30nm	5.3mm	0.16mrad	33.2 mm	0.27	Φ24mm	405HP	FC/PC FC/APC Sma905	>92%
450nm	±30nm	5.8mm	0.12mrad	33.5 mm	0.26	Φ24mm	460HP		
525nm	±30nm	6.3mm	0.10mrad	34.3 mm	0.26	Φ24mm			
635nm	±30nm	7.0mm	0.12mrad	35.3 mm	0.25	Φ24mm	630HP		
780nm	±30nm	7.4mm	0.14mrad	36.0 mm	0.25	Φ24mm	780HP		
850nm	±30nm	7.8mm	0.14mrad	36.2 mm	0.25	Φ24mm			
905nm	±30nm	7.5mm	0.15mrad	36.3mm	0.25	Φ24mm			
980nm	±30nm	8.5mm	0.16mrad	36.4 mm	0.25	Φ24mm	980HP		
1064nm	±30nm	7.9mm	0.17mrad	36.6 mm	0.25	Φ24mm			
1310nm	±30nm	6.6mm	0.24mrad	36.7 mm	0.24	Φ24mm	Smf-28e		
1550nm	±30nm	6.9mm	0.28mrad	37.1 mm	0.24	Φ24mm			
1654nm	±10nm	6.9mm	0.30mrad	37.2mm	0.24	Φ24mm			



MM LARGE BEAM COLLIMATORS

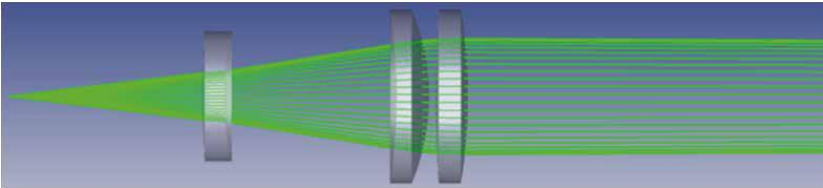
Wavelength	Bandwidth	Waist Beam	Divergence Angle	EFL	NA(Lens)	Pakage Dia.	Fiber Type	Connector	Transmittance
450nm	±30nm	18.0mm	2.3mrad	33.5 mm	0.27	Φ24mm	62.5/125	FC/PC Sma905	>92%
	±30nm	14.6mm	6.5mrad	33.5 mm	0.27	Φ24mm	200/220		
	±30nm	14.6mm	12.5mrad	33.5 mm	0.27	Φ24mm	400/440		
485nm	±30nm	15.0mm	4.0mrad	34.1mm	0.27	Φ24mm	105/125		
	±30nm	15.0mm	7.0mrad	34.1mm	0.27	Φ24mm	200/220		
	±30nm	15.4mm	12.8mrad	34.1mm	0.27	Φ24mm	400/440		
525nm	±30nm	18.2mm	2.2mrad	34.3 mm	0.27	Φ24mm	62.5/125		
	±30nm	14.9mm	3.5mrad	34.3 mm	0.27	Φ24mm	105/125		
	±30nm	14.9mm	6.2mrad	34.3 mm	0.27	Φ24mm	200/220		
	±30nm	15.2mm	12.6mrad	34.3 mm	0.27	Φ24mm	400/440		
635nm	±30nm	18.8mm	2.8mrad	35.3 mm	0.26	Φ24mm	62.5/125		
	±30nm	15.2mm	4.0mrad	35.3 mm	0.26	Φ24mm	105/125		
	±30nm	15.3mm	6.1mrad	35.3 mm	0.26	Φ24mm	200/220		
	±30nm	15.4mm	11.8mrad	35.3 mm	0.26	Φ24mm	400/440		
780nm	±30nm	19.0mm	2.7mrad	36.0 mm	0.26	Φ24mm	62.5/125		
	±30nm	15.6mm	3.1mrad	36.0 mm	0.26	Φ24mm	105/220		
	±30nm	15.5mm	5.9mrad	36.0 mm	0.26	Φ24mm	200/220		
	±30nm	15.5mm	11.6mrad	36.0 mm	0.26	Φ24mm	400/440		
850nm	±30nm	19.1mm	2.7mrad	36.2 mm	0.26	Φ24mm	62.5/125		
	±30nm	15.6mm	3.2mrad	36.2 mm	0.26	Φ24mm	105/220		
	±30nm	15.6mm	5.8mrad	36.2 mm	0.26	Φ24mm	200/220		
	±30nm	15.6mm	11.4mrad	36.2 mm	0.26	Φ24mm	400/440		
905nm	±30nm	15.7mm	3.3mrad	36.3 mm	0.26	Φ24mm	105/220		
	±30nm	15.7mm	5.9mrad	36.3 mm	0.26	Φ24mm	200/220		
	±30nm	19.4mm	2.4mrad	36.6 mm	0.26	Φ24mm	62.5/125		
1064nm	±30nm	15.8mm	3.4mrad	36.6 mm	0.26	Φ24mm	105/125		
	±30nm	16.0mm	6.4mrad	36.6 mm	0.26	Φ24mm	200/220		
	±30nm	16.0mm	12.2mrad	36.6 mm	0.26	Φ24mm	400/440		
1310nm	±30nm	19.4mm	2.3mrad	36.7 mm	0.25	Φ24mm	62.5/125		
	±30nm	15.8mm	3.5mrad	36.7 mm	0.25	Φ24mm	105/125		
	±30nm	15.8mm	6.1mrad	36.7 mm	0.25	Φ24mm	200/220		
	±30nm	15.9mm	11.6mrad	36.7 mm	0.25	Φ24mm	400/440		

1550nm	±30nm	19.4mm	2.1mrad	37.1 mm	0.25	Φ24mm	62.5/125	FC/PC Sma905	>92%
	±30nm	15.9mm	3.4mrad	37.1 mm	0.25	Φ24mm	105/125		
	±30nm	15.9mm	6.1mrad	37.1 mm	0.25	Φ24mm	200/220		
	±30nm	16.0mm	11.6mrad	37.1 mm	0.25	Φ24mm	400/440		

- All testing data for beam size and divergence angle are obtained by connecting the standard jumpers from Rays optics.
- Also applicable for polarization maintaining fiber with corresponding wavelength.
Waist beam diameter: Take the Gaussian beam at 1/e2 and use the theoretical calculated values for each wavelength using single-mode fibers.
- Beam far-field divergence angle: The input uses single-mode optical fibers with various wavelengths, calculated according to the Gaussian beam 1/e2 theory. Tolerance is +0.003°/0.0°.

6. Long Distance Collimators

The fiber optic beam can be collimated and shaped for different lasers output through fiber optic connections, providing diffraction-limited performance at the design wavelength, with a collimation distance of up to 200 meters. The structure of this series of collimators is compact. Aberration correction is performed during design by selecting an air-spaced doublet lens series, which has an excellent collimation effect and the ability to couple the space lights. The effective focal length of the doublet lens depends on the wavelength. Therefore, this series of collimators should be used at the design wavelength for optimal performance.





MULTIMODE FIBER

Wavelength	Bandwidth	Waist Beam	Divergence Angle	EFL	NA(Lens)	Fiber Type	Connector	Transmittance
450nm	±30nm	25.0mm	2.0mrad	50.11mm	0.25	62.5/125	FC/PC FC/APC Sma905	>92%
	±30nm	22.0mm	4.9mrad	50.11mm	0.25	200/220		
	±30nm	22.0mm	8.93mrad	50.11mm	0.25	400/440		
485nm	±30nm	22.0mm	2.75mrad	50.1mm	0.25	105/125		
	±30nm	22.0mm	4.6mrad	50.1mm	0.25	200/220		
525nm	±30nm	25.0mm	2.4mrad	50.12mm	0.25	62.5/125		
	±30nm	22.0mm	2.5mrad	50.12mm	0.25	105/125		
	±30nm	22.0mm	4.5mrad	50.12mm	0.25	200/220		
	±30nm	22.0mm	8.5mrad	50.12mm	0.25	400/440		
635nm	±30nm	25.0mm	2.0mrad	50.2mm	0.25	62.5/125		
	±30nm	22.0mm	2.3mrad	50.2mm	0.25	105/125		
	±30nm	22.0mm	4.6mrad	50.2mm	0.25	200/220		
	±30nm	22.0mm	8.2mrad	50.2mm	0.25	400/440		
780nm	±30nm	25.0mm	4.1mrad	49.17mm	0.25	62.5/125		
	±30nm	22.0mm	2.5mrad	49.17mm	0.25	105/125		
	±30nm	22.0mm	4.4mrad	49.17mm	0.25	200/220		
850nm	±30nm	22.0mm	4.1mrad	50.05mm	0.25	62.5/125		
	±30nm	22.0mm	2.4mrad	50.05mm	0.25	105/125		
	±30nm	22.0mm	4.3mrad	50.05mm	0.25	200/220		
	±30nm	22.0mm	8.4mrad	50.05mm	0.25	400/440		
905nm	±30nm	10.9mm	4.5mrad	24.99mm	0.25	105/125		
	±30nm	10.9mm	8.3mrad	24.99mm	0.25	200/220		
1064nm	±30nm	25.0mm	4.5mrad	49.84mm	0.25	62.5/125		
	±30nm	21.2mm	2.8mrad	49.84mm	0.25	105/125		
	±30nm	21.2mm	4.9mrad	49.84mm	0.25	200/220		
	±30nm	21.2mm	9.3mrad	49.84mm	0.25	400/440		
1310nm	±30nm	25.0mm	4.5mrad	49.97mm	0.25	62.5/125		
	±30nm	21.2mm	2.7mrad	49.97mm	0.25	105/125		
	±30nm	21.2mm	4.8mrad	49.97mm	0.25	200/220		
	±30nm	21.2mm	9.2mrad	49.97mm	0.25	400/440		
1550nm	±30nm	25.0mm	4.5mrad	50.16mm	0.25	62.5/125		
	±30nm	21.2mm	2.7mrad	50.16mm	0.25	105/125		
	±30nm	21.2mm	4.8mrad	50.16mm	0.25	200/220		
	±30nm	21.2mm	9.1mrad	50.16mm	0.25	400/440		

SINGLE-MODE FIBER

Wavelength	Bandwidth	Waist Beam	Divergence Angle	EFL	NA(Lens)	Fiber Type	Connector	Transmittance
405nm	±30nm	10.2mm	0.09mrad	66.5mm	0.19	405HP	FC/PC FC/APC Sma905	>92%
450nm	±30nm	13.7mm	0.07mrad	68.4mm	0.18	460HP		
520nm	±30nm	14.2mm	0.06mrad	70.3mm	0.18			
635nm	±30nm	14.5mm	0.07mrad	72.1mm	0.17	630HP		
780nm	±30nm	14.2mm	0.07mrad	73.3mm	0.17	780HP		
850nm	±30nm	14.9mm	0.07mrad	73.7mm	0.17			
905nm	±30nm	14.9mm	0.07mrad°	73.9mm	0.17			
980nm	±30nm	15.0mm	0.09mrad	74.2mm	0.17	980HP		
1064nm	±30nm	15.2mm	0.09mrad	74.5mm	0.17			
1310nm	±30nm	12.9mm	0.12mrad	75.1mm	0.17	Smf-28e		
1550nm	±30nm	14.2mm	0.14mrad	75.6mm	0.17			
1650nm	±30nm	14.5mm	0.14mrad	76.0mm	0.17			

