Intane® OPTICS 英田光学

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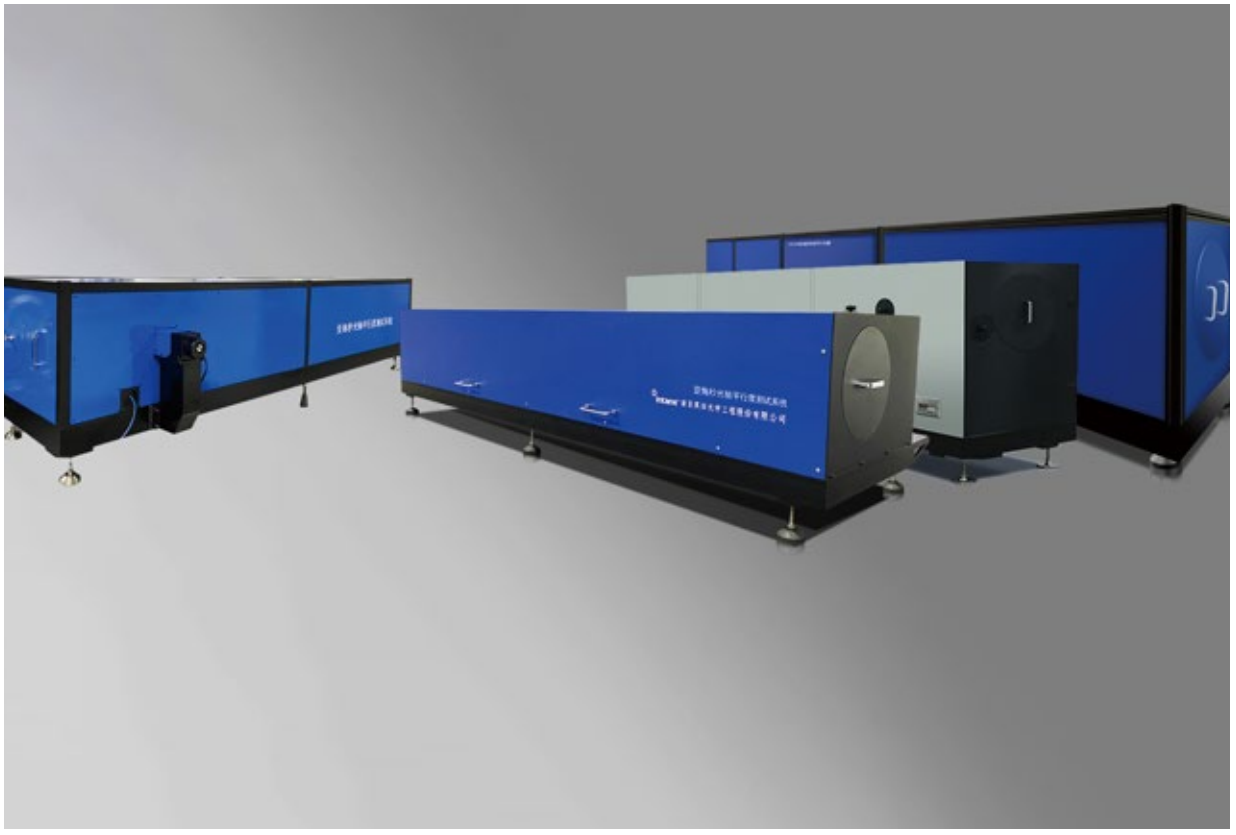
OPTICAL SOLUTIONS

CONTENTS

Intane OPTICS 英田光学

Collimators



Company profile

Founded in 2003 by Professor Zhou Bifang, former Director of the Nanjing Astronomical Instruments Research Center at the Chinese Academy of Sciences, Nanjing Intane Optics has become a trusted leader in precision optical engineering.We specialize in developing and commercializing a wide range of collimators, including reflective, refractive, and catadioptric collimators.

Our product offerings include both standard off-the-shelf instruments and fully customized electro-optical test systems, designed to meet the specific needs of our clients.

As a national high-tech enterprise, our strength lies in the design, development, and manufacturing of high-performance collimators and test equipment known for their precision, reliability, and versatility. Backed by a team of experienced engineers and cutting-edge technology, we ensure every product meets the highest performance standards. From optical modeling and system integration to rigorous testing and advanced coatings, we guarantee consistent beam quality, alignment, and testing accuracy across a wide range of applications.

Our unwavering commitment to innovation and excellence has established us as the preferred partner for customers seeking reliable solutions in scientific research, industrial processes, and advanced optical systems.

Contents

ONE WORLD CONNECTED WITH LASER

Reflective collimator

Our reflective collimator systems offer exceptional versatility, unaffected by the dimensions and transmissive properties of optical material blanks—such as refractive index, uniformity, surface defects, and bubble extent. Typically crafted from materials like fused quartz, Zerodur, or, for specific applications, aluminum or SiC, these systems provide optimal performance across a wide range of conditions.

These collimators are free from the limitations of operating frequency and chromatic aberration, making them suitable for applications across the ultraviolet to long-wave infrared spectrum. They often incorporate aspheric components, enabling the design of high-precision systems with large apertures (up to 1.5 meters) and long focal lengths (ranging from tens of meters to over one hundred meters).

Depending on the specific application, the optical paths can include Newtonian, Cassegrain, RC reflection, multiple reflections, or spherical reflection configurations. The design may be either co-axial or off-axis, tailored to meet the required shielding and precision standards.

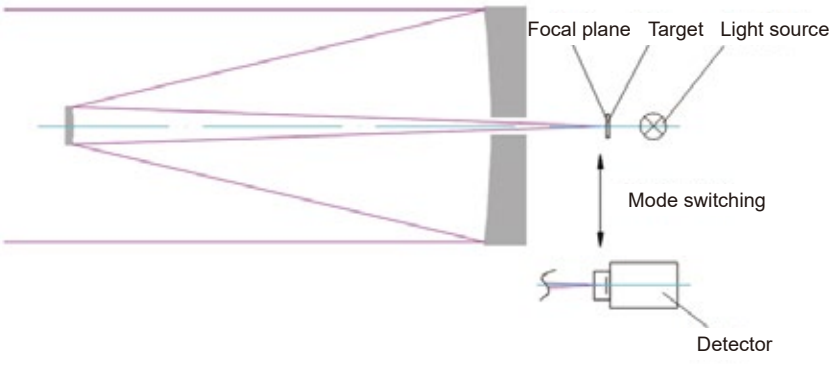
For coatings, options include metal coatings (such as aluminum, silver, or gold) or dielectric coatings, selected based on transmittance requirements and laser loss thresholds—up to 100 W/cm² for metal coatings, or up to 30 kW/cm² for dielectric coatings.

Additionally, these systems can be designed with lightweight structures, providing flexibility for various demanding applications.

Parameters:

Structure	Newtonian, Cassegrain, or RC reflection
Clear aperture	50 mm ~ 1500mm
Working wavelength	Reflective, from ultraviolet light to infrared light
Focal ratio	F3 ~ F10
System Accuracy	RMS ≤ λ/25 @632.8nm (depending on the optical parameters and the form)

* Special parameters are customizable.



Schematic Diagram of Reflective Collimator

100mm off-axis reflective collimator

Parameters:

Clear aperture	φ100mm	Effective focal length	1.5m
Working Wavelength	400nm ~ 2500nm	Beam parallelism	<2.5″
System Accuracy	RMS ≤λ/20 (λ= 632.8nm)	Weight	<200kg
Regulator	Fine adjustment with multi-degree of freedom		

200mm on-axis collimator

Parameters:

Focal length	1600mm ± 0.5%
Clear aperture	φ200mm
Surface accuracy	λ/20 RMS (λ= 632.8nm)
Material	SCHOTT ZERODUR®

200mm off-axis three-mirror collimator

Parameters:

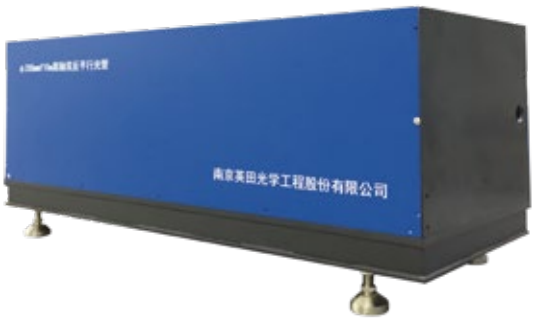
Clear aperture	φ200mm	Focal length	1000mm
Relative aperture D	1/7.5	Field	1°, far field
System Accuracy	In full field, λ/15 RMS, λ= 632.8nm		
Structure	off-axis three-mirror structure		
Overall dimensions	1100mm x 700mm x 500mm		

200mm sub-arcsecond parallelism test system

Parameters:

Focal length	2150mm/215mm
Clear aperture	φ200mm
System Accuracy	λ/25 RMS (λ= 632.8nm)
Operating wavelength	400 nm ~ 900nm
Beam parallelism	1"
Operating conditions	Room temperature
Optical test system with axis conformity accuracy : 0.5″(based on CCD camera resolution application)	

200mm off-axis Newtonian collimator



Parameters:

Type	Off-axis Newtonian reflection type
System Accuracy	λ/25 RMS (λ= 632.8nm)
Working wavelength	0.5 ~ 0.95um, 1.45 ~ 1.6um
Clear aperture	200mm
Focal length	10m

220mm off-axis Newtonian reflection collimator

Parameters:

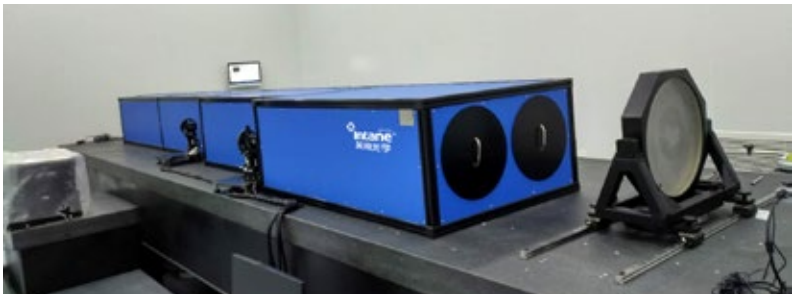
Clear aperture	φ220mm	Operating wave band	0.35um ~ 2um
Field	1.3°	System Accuracy	λ/25 RMS @632.8nm
External dimensions	≤1100 x 750mm x 500mm	Mechanical material	Invar
Height adjustment range	±5mm	Temperature	0° ~ 40°
Vibration resistance	Random vibration	Sinusoidal vibration 5Hz ~ 55Hz	Peak: 0.33mm

250mm On-axis Newtonian reflection collimator

Parameters:

Clear aperture	φ250mm
Primary and secondary mirror material	ZERODUR®
System Accuracy	λ/25 RMS, λ= 632.8nm
Focal length	1500mm
Material of window protection glass	Fused Silica
Operating wavelength	355nm, 532nm, 1064nm

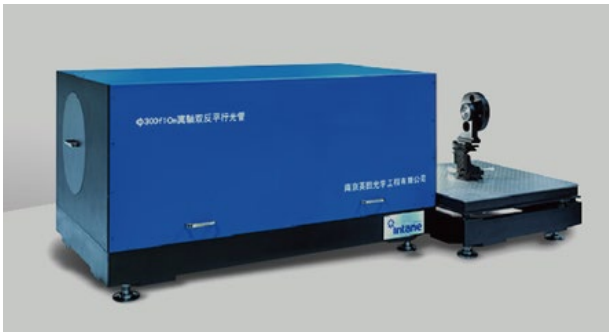
300mm Bifocal off-axis reflective collimator



Parameters:

Technical index	Acceptance value
Clear aperture	≥300mm
Reflection coatings	Ag + protection coating: reflectivity: >95%; wavelength: 632.8nm, 800nm, 1550nm
Focal length of off-axis system	18m/6m
System Accuracy	λ/25 RMS, λ= 632.8nm
Center height of optical axis	270 ± 10mm

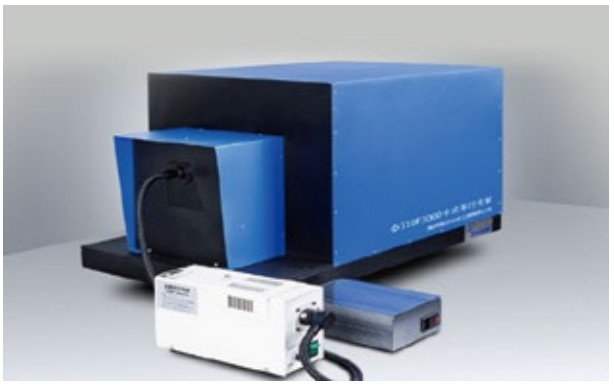
300mm off-axis Cassegrain reflection collimator



Parameters:

Clear aperture	φ310mm
Field	2ω= 0.5°
Focal length	3000mm
Operating wavelength	450nm ~ 2500nm
System Accuracy	0。 field: λ/25 RMS; 0.5° field, λ/10 RMS; 1° field, λ/2 RMS (λ = 632.8nm)

310mm off-axis Cassegrain reflection collimator



Parameters:

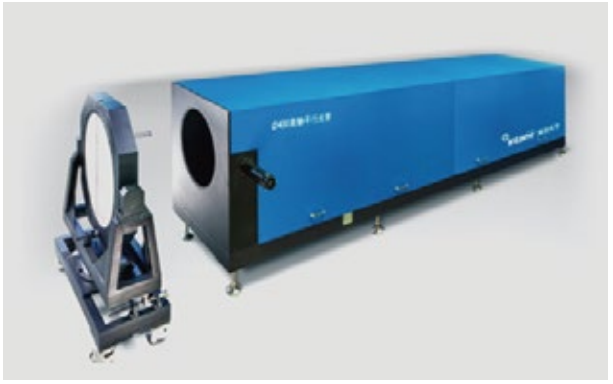
Clear aperture	φ310mm
Field	2ω= 0.5°
System Accuracy	0° field: λ/25 RMS 0.5° field, λ/10 RMS ; 1° field, λ/2 RMS (λ = 632.8nm)
Focal length	3000mm
Operating wave band	450nm ~ 2500nm

330mm off-axis reflective collimator

Parameters:

Clear aperture	φ330mm
Woking wavelength	Reflective part: 300nm ~ 1100nm; transmission part: 400nm ~ 900nm
Transmittance variation	Tpv ≤11.5%
Parallelism	Superior to 0.836″ (Φ ≤150mm)
Focal length	3000mm
System Accuracy	λ/25 RMS (λ=632.8nm)
Thermal stability of the optical axis	Superior to 0.89″/℃ (20℃ ± 5℃)

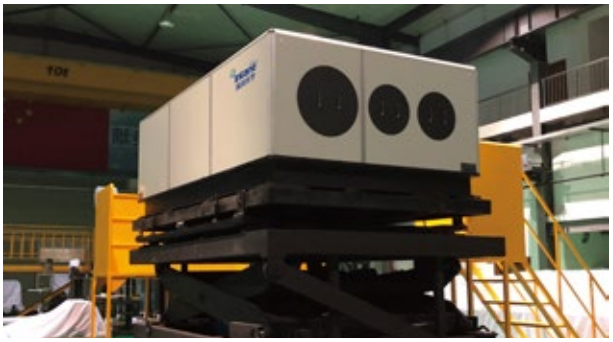
400mm off-axis Newtonian reflection collimator



Parameters:

Clear aperture	φ400mm
System Accuracy	λ/25 RMS, λ = 632.8nm
Focal length	4000mm
Operating wavelength	0.4 ~ 2μm

500mm off-axis collimator



Parameters:

Aperture	500mm
Focal length	3000mm
System Accuracy	λ/25 RMS，λ=632.8nm
Wave band of light source	Visible light, near-infrared light, medium-wave infrared light, long-wave infrared light

800mm on-axis collimator

Parameters:

Clear aperture	φ800mm
Field	35mm
Operating wavelength	0.4 ~ 20μm
Focal length	15000mm
System Accuracy	λ/20 RMS (λ = 632.8nm)

1200mm off-axis collimator

Parameters:

Structure	Off-axis Newtonian	Effective aperture	φ1200mm
Focal length	8000mm	Effective field	45´
Reflectivity	>0.96, 3 ~ 12um	System Accuracy	λ/15 RMS (λ = 632.8nm)

Applications:

1. Testing, calibration, and simulated evaluation of aerospace equipment, including high-precision spaceborne systems and optical components such as satellite cameras, space telescopes, and spacecraft optical sealed windows.
2. Testing and calibration of airborne optical systems and equipment.
3. Testing and calibration of high-precision optical instruments and components.

1500mm On-axis Cassegrain reflection collimator

Parameters:

Clear aperture	φ1500mm	Focal length	52m (±2%)
Field	≥6´	Wave band	0.4μm~5μm
Center height	3000mm	suface accuracy (RMS) of the primary mirror	λ/40@632.8nm (offner testing)Coaxial
System Accuracy	λ/10 RMS，λ=632.8nm	Structure	Cassegrain
Location of focal plane	Nasmyth focus	Environmental adaptability	Focal plane moving ≤±0.6mm (22±5℃)

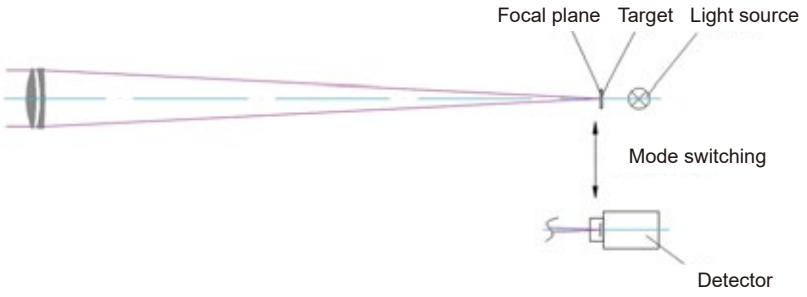
Refractive collimator

1. These systems typically feature spherical optical components, offering a simple structure, lightweight design, and high precision, making them ideal for routine optical testing and calibration.
2. Due to size and material transmission limitations, these systems are best suited for visible light applications and are not recommended for large-aperture, full-waveband objects.
3. Within a narrow wavelength range, the systems are capable of achieving larger fields of view.

Parameters:

Parameter	Value
Structure	Refractor
Clear aperture	≤150mm
Operating wavelength	Usually 400nm ~ 800nm near-infrared single wavelength
Focal length	F1 ~ F10
System Accuracy	RMS ≤λ/25 (depending on the optical parameters)

* Special parameters are customizabl.



Schematic Diagram of Refractive Collimator

80mm refractive collimator

Parameters:

Operating wavelength	905nm, 1550nm	Focal length	80mm
Clear aperture	φ50mm	Field	>0.5°
Angular resolution	<0.1mrad	Far-field spot position precision	<0.1mm

Beam quality measuring device

The 130mm refractive collimator is engineered to deliver exceptional performance across multiple wavelength bands. Featuring advanced achromatism, athermalization, and vibration resistance, this device ensures high-precision measurements of far-field laser beam quality. Its robust design and innovative technology make it ideal for demanding applications that require accuracy and reliability.

Parameters:

Clear aperture	Φ130mm
Expanding/converging times of beam expander	12X
Operating wavelength	1020nm ~ 1095nm, 532nm, 633nm
System Accuracy	λ/4 PV ， λ=632.8nm
Operating temperature	-10℃ ~ 40℃
Focusing lens	320mm

50mm refractive collimator

Parameters:

Operating wavelength	1550nm
Clear aperture	Φ50mm
Angular resolution	<0.1mrad
Focal length	140mm
Field	>0.5°
System accuracy	λ/3 PV ， λ=632.8nm

140mm refractive collimator

Parameters:

Focal length	1000mm
System Accuracy	λ/15 RMS，λ=632.8nm
Aperture	Φ140mm

Large-field collimator

Parameters:

Focal length	500±10mm	Operating wavelength	900 ~ 910nm
Entrance pupil size	>40mm	Entrance pupil position	Distance from the first lens > 100mm
Field	>±16°	Far-field spot position precision	<50um
Angular resolution	Center: ± 6°, field <0.01°, fringe field of view <0.02°		
System distortion	Optical system <3%	Stray light of system	PSRR <10-5
Lens coating	Anti-reflection by 99.5%	Optical structural member	Blackening or delustering is needed
Frosted glass	300 * 100 close to Lambertian scattering	Star tester	50 um -Φ25-H-K9L
Cross reticle	16*16 -Φ25-H-K9L	Porro board	Φ25-H-K9L
Resolving power test target	USAF-76.2*76.2-H-K9L	External dimensions	≤1.5*Φ200mm
Operating conditions	Temperature: 20℃ ~ 30℃; relative humidity: 30%~90% (Applicable to ordinary workshops)		

50mm refractivecollimator

Parameters:

Operating wavelength	905nm, 1550nm
Clear aperture	Φ50mm
Angular resolution	<0.1mrad
Focal length	1000mm
Field	>0.5°
Far-field spot position precision	<0.1mm

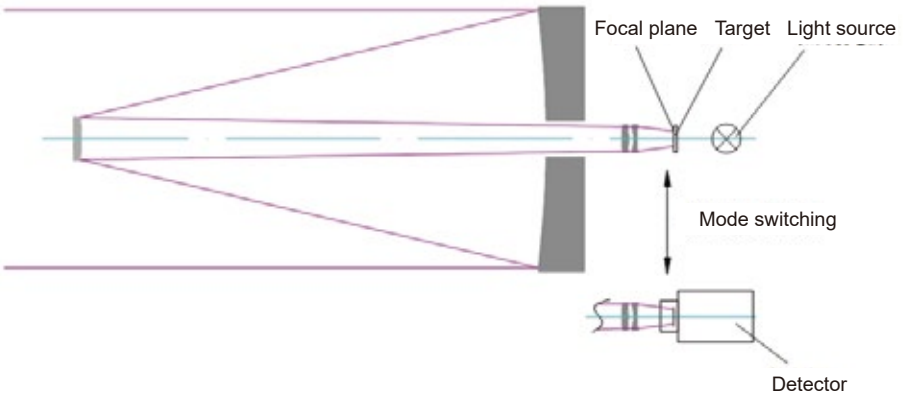
Catadioptric collimators

A catadioptric collimator represents an innovative evolution of the traditional reflective collimator by incorporating an additional transmissive element. This unique combination leverages the core benefits of reflective collimators while introducing new capabilities. The result is an advanced optical system that supports large apertures, extended focal lengths, expansive fields of view, and exceptional precision. These attributes make catadioptric collimators ideal for applications requiring high-performance optical engineering, such as astronomical observations, laser communication, and precision metrology. Their design balances complexity with unparalleled optical quality, offering solutions tailored to meet the demanding needs of modern optical systems.

Parameters:

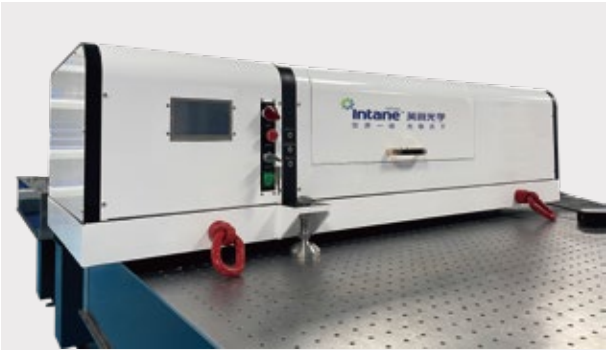
Parameter	Value
Structure	Catadioptric
Clear aperture	Φ50mm ~ 1500mm
Operating wavelength	The visible light or the near-infrared wavelength
Focal length	F3 ~ F10
System Accuracy	RMS ≤λ/15 @632.8nm

* Special parameters are customizabl.



Schematic Diagram of Catadioptric Collimator

CA250F1500 OFF-AXIS RC COLLIMATOR



Parameters:

Clear aperture	φ250mm
Focal length	1500mm
System Accuracy	λ/20 RMS，λ=632.8nm
Working wavelength	400～2500 nm

400mm catadioptric collimator

Parameters:

Clear aperture	φ400mm
Focal length	2130mm
Field	≥40.2°
Focusing resolution	≤5μm
Focusing range	≥4mm
System Accuracy	λ/15 RMS，λ=632.8nm

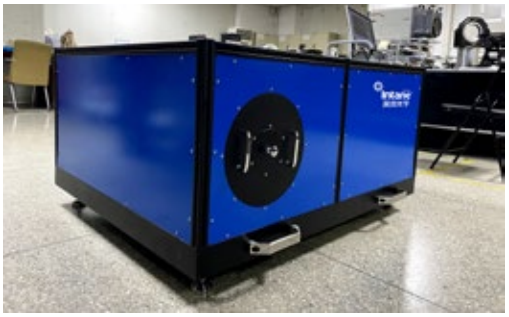
90mm catadioptric collimator

The 90mm Catadioptric Collimator with Anti-Interference Performance Testing System is an advanced optical alignment solution designed to meet the stringent requirements of precision optical engineering and testing. This system utilizes a catadioptric design, combining both reflective and refractive elements to create an exceptional collimated light source. It is engineered to deliver unparalleled performance in a wide range of testing applications, particularly in environments where interference from external factors such as vibrations, temperature fluctuations, and electromagnetic noise is a concern.

Parameters:

Clear aperture	90mm
Emergent beam parallelism	≤1′
Operating wavelength	3um~5um
System Accuracy	λ/15 RMS，λ=632.8nm

Off-axis beam expander



The Off-Axis Beam Expander is a state-of-the-art optical solution, engineered for high-precision applications in remote optical communication systems. Designed to optimize the performance of optical communication devices, this advanced system integrates a 15X beam-expanding antenna, a beacon signal receiving and transmitting path, a power detector, and an interference simulation module, all within a single, cohesive unit. It seamlessly combines optical, mechanical, and electrical components, offering a comprehensive, one-stop workstation for thorough system testing and simulation.

Parameters:

Antenna type	Off-axis beam expansion
Clear aperture	250mm
Operating wavelength	0.5 ~ 0.85μm, 1.05 ~ 1.7μm
System Accuracy	λ/15 RMS，λ=632.8nm

Dynamic test simulation system

The Dynamic Test Simulation System features a 350mm through-light aperture and a 3034mm focal length coaxial foldback parallel light tube. It consists of an optical system, machine housing, cross target, uniform light source, cross target fine-tuning mechanism, light tube fine-tuning mechanism, laser indication unit, and other integral components. This system is designed to effectively simulate the generation of infinity targets, providing high-precision testing capabilities.

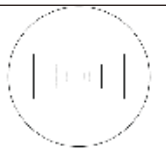
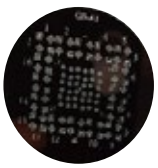
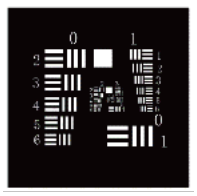
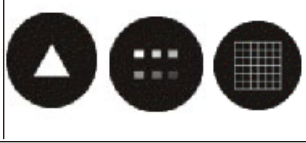
Internal channel far-field spot measurement system

The Internal Channel Far-Field Spot Measurement System is a high-precision optical measurement solution, designed to characterize and assess the far-field beam quality of various optical systems. This advanced system incorporates a high-quality beam expander and a carefully engineered measuring optical path, enabling accurate and efficient far-field beam analysis. It covers a broad range of wavelengths, including the mid-infrared and infrared bands, making it ideal for applications requiring precise out-field measurements of optical beams.

Parameters:

Clear aperture	Φ450mm
Main beam expander wavefront aberration	pv <λ/3, RMS <λ/15 (λ = 632.8nm)
Mid-infrared focus lens combination	3μm ~ 5μm achromatism, pv <λ/4 (λ = 632.8nm)
Near-infrared focus lens combination	0.9μm ~ 1.7μm achromatism, pv <λ/4 (λ = 632.8nm)

Collimator accessories

Category of accessory	Appearance	Accessory	Specification	Material	Application
Target		Star tester	5μm ~ +	Optical glass (usually fused quartz or K9L) or another metallic material (usually stainless steel), depending on the wave band used	I The target is typically placed on the focal plane of the collimator and can be used in conjunction with a light source or detector for various applications, such as optical axis alignment or aiming (e.g., cross reticle), lens focal length measurement (using a Porro board), lens resolution testing (via a star tester or resolving power test target), MTF evaluation (using a knife edge target), MRTD testing (with a four-bar or triangular target), NETD assessment (with a square target), and more. The selection of target size, line width, and line pair spacing depends on the specifications of the tested component and the system requirements.
		Cross reticle	Determine according to conditions on the site.		
		Porro board	Choose the line pair according to the need.		
		Resolving power test target	A1-A7	Usually fused quartz or K9, or an infrared materi-al, depending on the wave band used	
		USAF1951 target plate	-2~7 group	Optical glass (usually fused quartz or K9) or another metallic material (usually stainless steel), depending on the wave band used (the latter choice is difficult to realize when the resolution is high)	
		Four-bar target	Choose the line width and the line pair according to the resolution requirement.	Optical glass (usually fused quartz or K9) or another metallic material (usually stainless steel), depending on the wave band used (the latter choice is difficult to realize when the resolution is high)	
		Semi-circle target	Optical glass	Optical glass (usually fused quartz or K10) or another metallic material (usually stainless steel), depending on the wave band used (the latter choice is difficult to realize when the resolution is high)	
		Other	There are many other targets such as triangular targets, gray scale target, profile target, square target or distortion target. Choose according to the application.		

Category of accessory	Accessory	Corresponding wave band	Application
Light source	Deuterium lamp	Ultraviolet light	By positioning the light source on the focal plane of the collimator, various target types can be generated at infinity when used with appropriate target configurations. These infinite-distance targets are then received by the tested elements (for specific applications, refer to the 'Application' column in the target description table above). The selection of the light source is determined by the operating wavelength required for the application.
	Xenon lamp	Ultraviolet light + visible light	
	LED lamp	Single-color light or white visible light	
	Halogen lamp	Visible light + near-infrared light	
	High-temperature blackbody furnace	Near-infrared light	
	Medium-temperature blackbody furnace	Mid-infrared light	
	Low-temperature blackbody furnace	Far-infrared light	
	Fiber laser	Visible light ~ infrared light	

Category of accessory	Accessory	Description	Application
Detector	Area array detector	CCD, CMOS … (visible light/infrared light)	The detector is typically positioned on the focal plane of the collimator to receive targets at infinity. It is commonly used for applications such as multiaxis aiming, remote sensing, scattering detection, and laser communication. The choice of detector should be based on the specific target being received and the requirements of the application.
	Dot matrix detector	PMT, APD … (for detecting photon information)	
	Linear array detector	For scanning imaging, etc.	
	Optical fiber	For laser communication receiving, signal detection, etc.	
	Other		

Automatic control module

The advanced edition of the collimator offers an optional upgrade kit, which includes a sophisticated automatic control module. This module is equipped with intuitive user interfaces, allowing for seamless integration and enhanced operational efficiency. Designed for ease of use, it enables users to automate key functions, streamline workflows, and achieve precise adjustments with minimal manual intervention. The control module is fully customizable to suit a wide range of applications, providing improved flexibility and control over system performance.

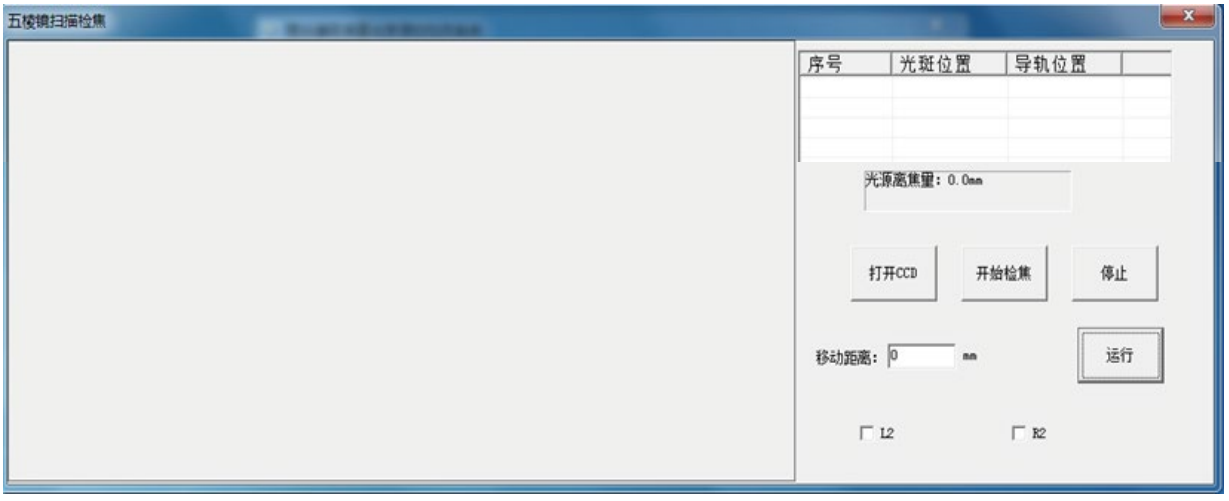
Switching Interface of Cross Reticle

The collimator is equipped with a versatile switching interface for the cross reticle, allowing users to easily adjust and switch between different reticle configurations. This feature enhances operational flexibility, enabling precise alignment and aiming across various applications. The interface is designed for quick, intuitive adjustments, ensuring seamless transitions between reticle patterns to meet specific measurement and testing requirements.

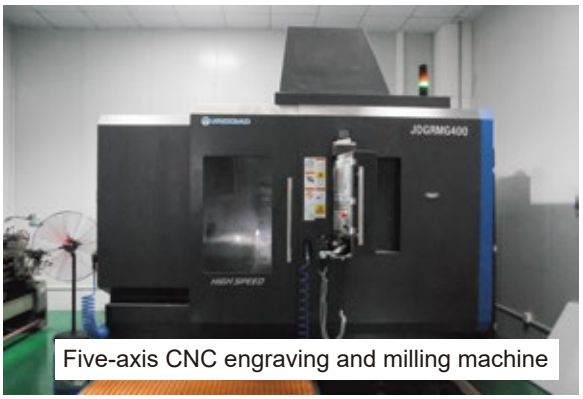
Switching Interface of Light Source and Optical Path

The collimator is equipped with a user-friendly switching interface that allows seamless selection between different light sources and optical paths. This interface provides the flexibility to quickly switch configurations, optimizing the system for various testing and measurement applications. Whether for alignment, resolution testing, or MTF evaluation, users can effortlessly choose the appropriate light source and optical path to ensure precise and reliable results. The interface is designed for smooth operation, ensuring efficient transitions and enhanced versatility in diverse optical setups.

Interface of Auto-collimating Function

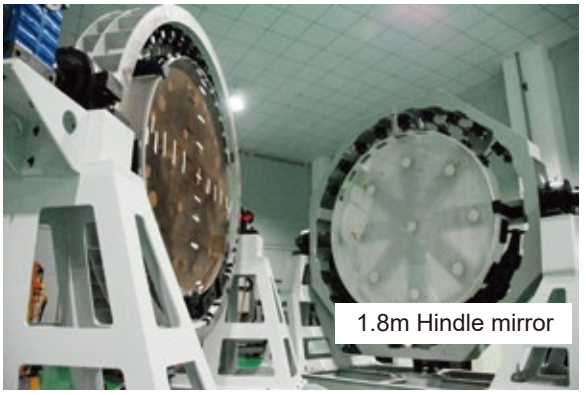


Interface of Automatic Focus Detection and Focusing Function


Five-axis CNC engraving and milling machine


Six-axis CCOS

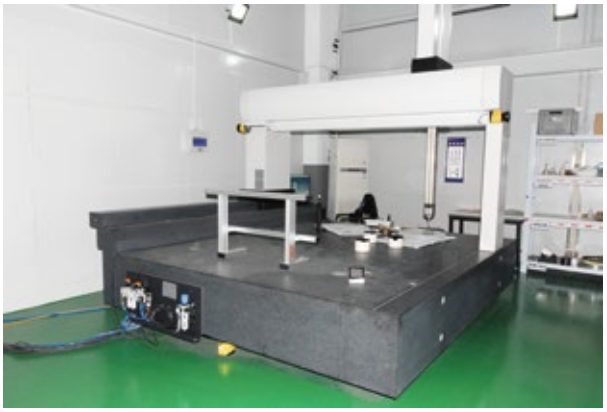

CNC single-axis machine


1.8m Hindle mirror


3D adjusting bracket


3m Ring polishing machine

2.2m coating machine

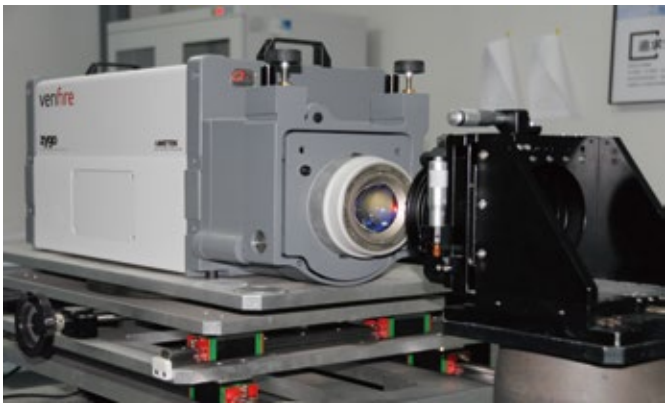


2m ZEISS PRISMO

9m precision vibration isolation optical platform

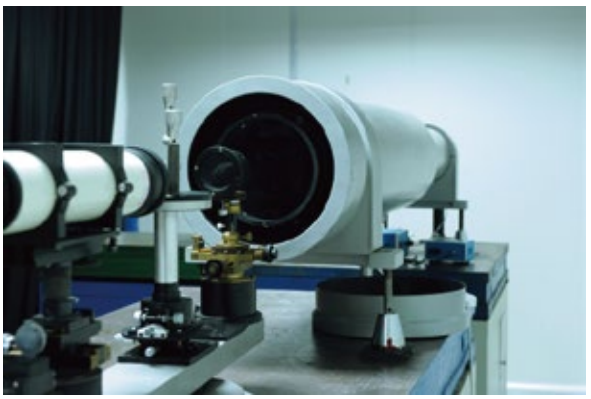
600mm plane interferometer

4D Dynamic i interferometer 4020



4″ZYGO digital wave flat interferometer

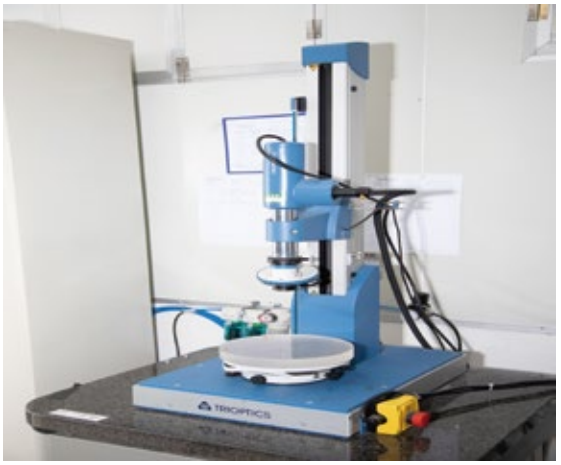
4D interferometer 6000



Collimator

Tool microscope

TRIOPTICS super spherometer

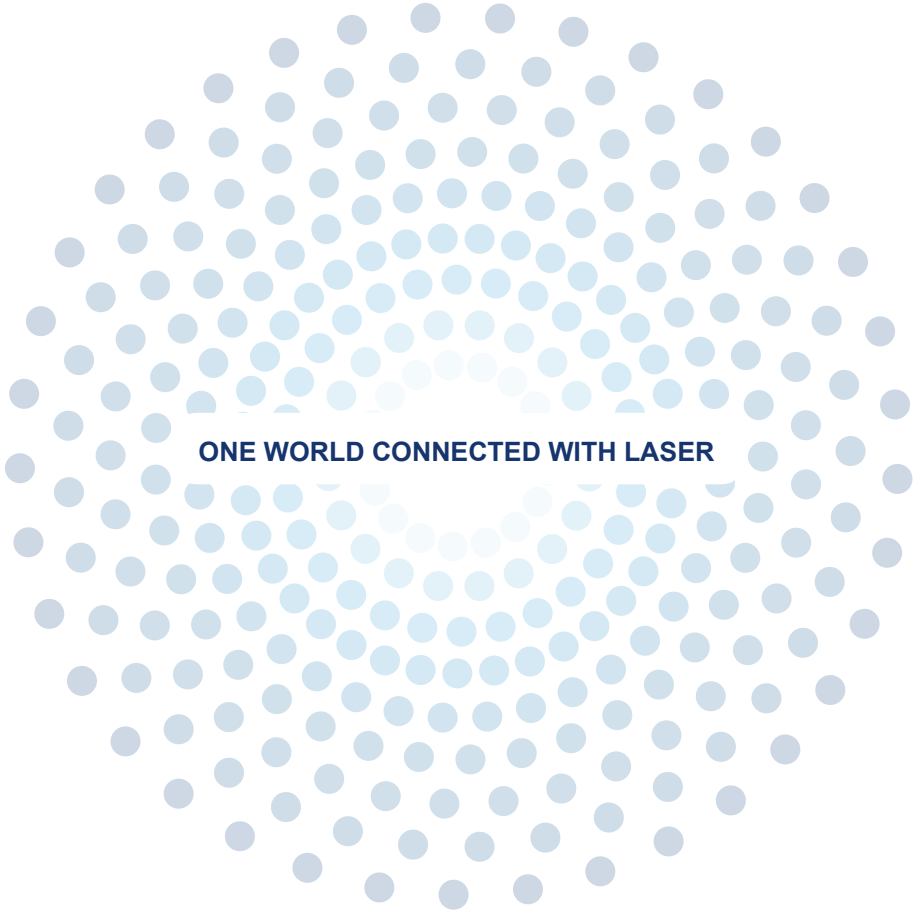


TRIOPTICS High-precision centration test device

Shimadzu UV3600

Profilometer LuphoScan420SD

Agilent Spectral detector



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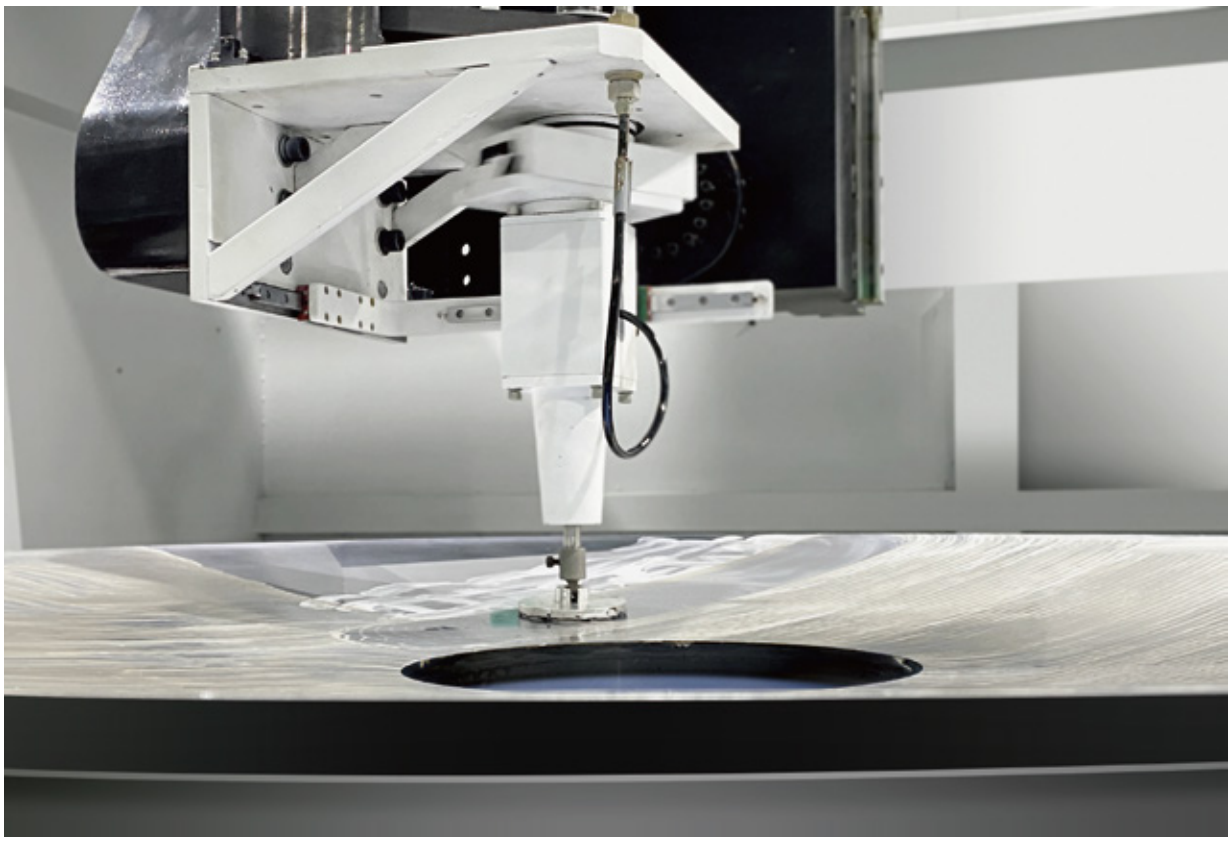


ONE WORLD CONNECTED WITH LASER

Company profile

Founded in 2003 by Professor Zhou Bifang, former director of the Nanjing Astronomical Instruments Research Center at the Chinese Academy of Sciences, Intane Optics has grown into a national high-tech enterprise specializing in precision optical system solutions.

With a core competency in optical engineering, the company prides itself on a team of seasoned engineers skilled in the design, integration, assembly, testing, and manufacturing of advanced optical components. These components are critical to the performance of precision optical instruments.

As technology advances and industry demands grow, Intane Optics continuously innovates to meet the increasing requirements for the performance and quality of optical elements, ensuring the highest standards for our clients.At Intane Optics, we are dedicated to achieving nanoscale precision in the production of optical components, including flat, spherical, aspherical, and freeform surfaces. Our 3,000-square-meter facility is equipped with a full suite of cutting-edge optical processing production lines.

We also specialize in developing advanced production equipment, such as swing-arm polishing, water-jet polishing, and Computer-Controlled Optical Surfacing (CCOS). Our state-of-the-art optical processing equipment includes 2 sets sixaxis CCOS capable of handling diameters exceeding 2 meters, 12 sets six-axis CCOS capable of 1 meter, a 3-meter ring polisher, a 2-meter single-axis machine, CNC machining centers, and Satisloh edge grinders.

To ensure the highest standards of accuracy and processing efficiency, We has made significant investments in testing equipment. Our facility is equipped with multiple 4D dynamic interferometers, ZYGO interferometers, a Zeiss coordinate measuring machine, Taylor Hobson LUPHOScan non-contact profilometer,and a 600mm plane interferometer. We currently house over 10 dynamic interferometers, 4 ZYGO interferometers, and a 600mm plane interferometer, ensuring precise quality control across all stages of production.

To further guarantee the reliability of our measurements, we have established a 200-square-meter constant-temperature environment to maintain optimal conditions for testing.

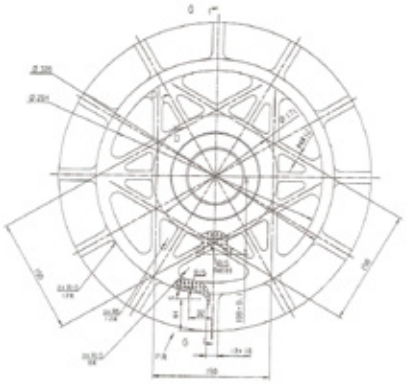
Based on high-precision optical components, Intane Optics also has developed a series of high-precision optical testing instruments and equipment. Collimators of various aperture and specifications have a good reputation among customers. Intane Opics: Your trusted supplier for precision optical system solutions.

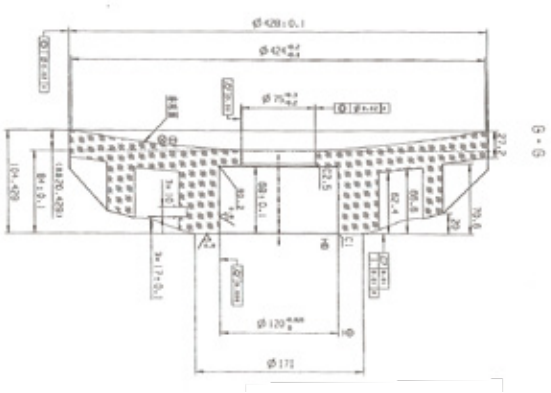
Contents

ONE WORLD CONNECTED
WITH LASER

Lightweight mirrors

Lightweight primary mirror

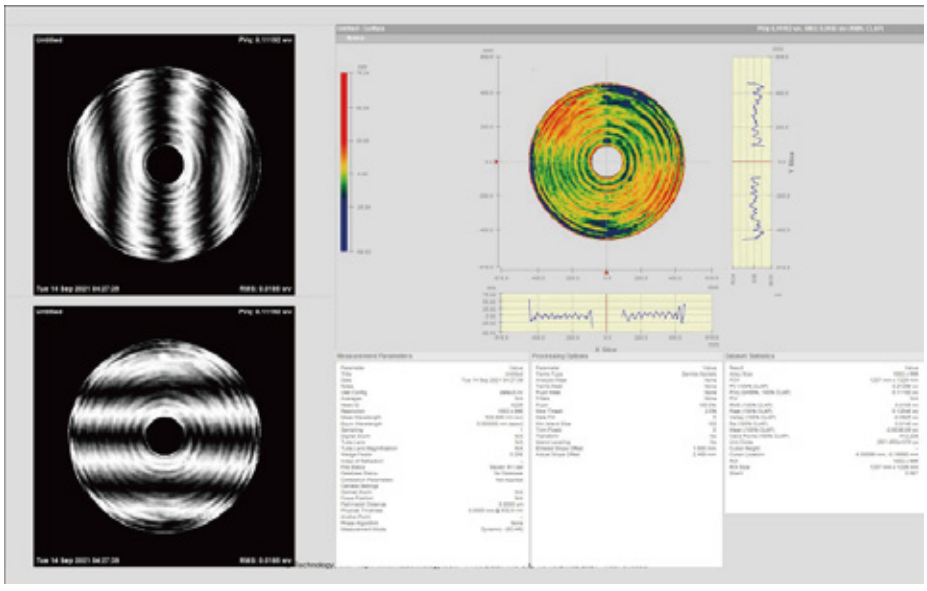




Spherical lens

Name	Inspection result	Inspection result		Inspection item	Inspection result	
		1#	2#		1#	2#
428mm lightweight Mirror	Outer diameter of A	Φ427.9979mm	Φ428.0565mm	Cylindricity of back hole	0.0119mm	0.0097mm
	Polished aperture	Φ425.7579mm	Φ425.9765mm	Coaxiality between outer circle and reference surface A	⊙0.0934mm	⊙0.0935mm
	Center thickness	84.0648mm	84.0981mm	Coaxiality between center hole and reference surface A	⊙0.0160mm	⊙0.0228mm
	Total thickness	104.5900mm	104.6821mm	Flatness of back	0.0027mm	0.0042mm
	Edge thickness	27.5253mm	27.4439mm	Perpendicularity of back (reference surface A)	0.0117mm	0.0065mm
	Diameter of back hole	Φ120.0145mm	Φ120.0031mm	R value	1099.9303mm	1099.7455mm

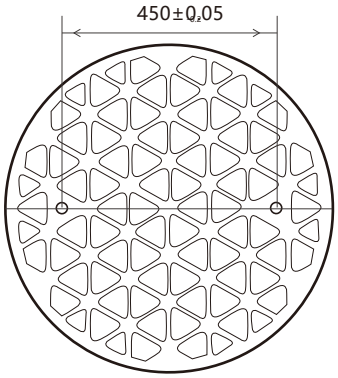
Interferometer Test Report:

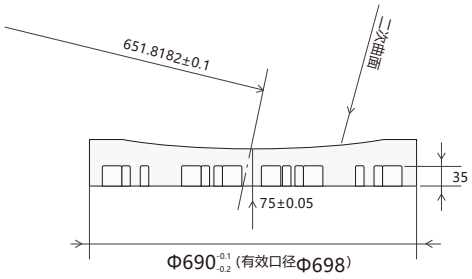


Surface Accuracy
λ/54 RMS

Aspheric Mirrors

Off-axis high-order aspheric primary mirrors

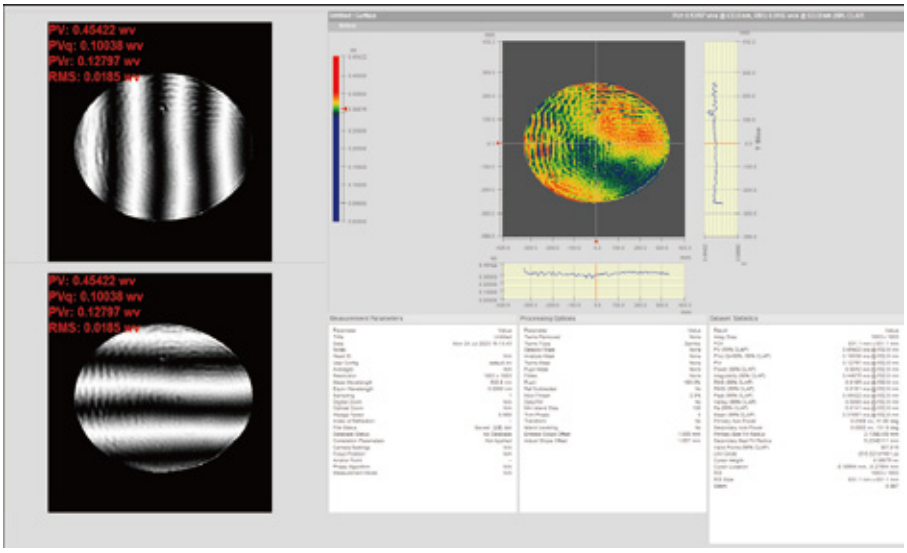




Parameters:

Name	Inspection item	Inspection result	Inspection item	Inspection result
690mm Off-axis high-order aspheric primary mirror	Outer diameter	Φ689.900mm	Distance of location hole	450mm
	Center thickness	75.0394mm	Top’ s radius of curvature (R)	3153.6264mm
	Edge thickness	92.3mm	K value	-1.0691
	Edge thickness difference	0.0395mm	Off-axis distance	651.8182mm
	Platform width	3.5mm	Clear aperture	665mm
	Diameter of location hole	20.07mm	Surface Quality	60/40 S&D
	Depth of location hole	34.96mm	Roughness	0.8nm
	TOP of location hole	0.0320mm	Surface flatness precision	RMS：0.0185λ
	Coating requirement	0.4um～0.5um：96.259%；0.5um～0.6um：96.029%；0.6um～1.2um：97.695%；1.2um～2.5um：98.169%；2.5um～14um：98.475%。		

Interferometer Test Report :

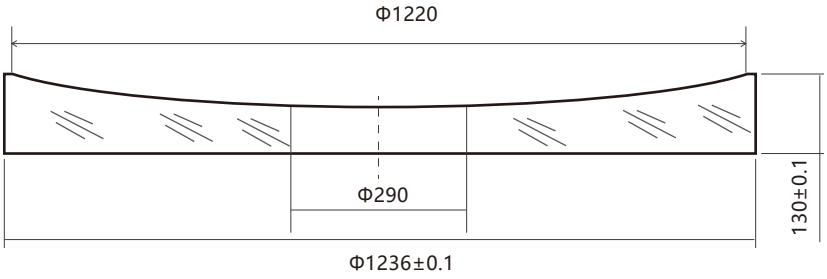


Surface Accuracy

λ/2 PV

λ/54 RMS

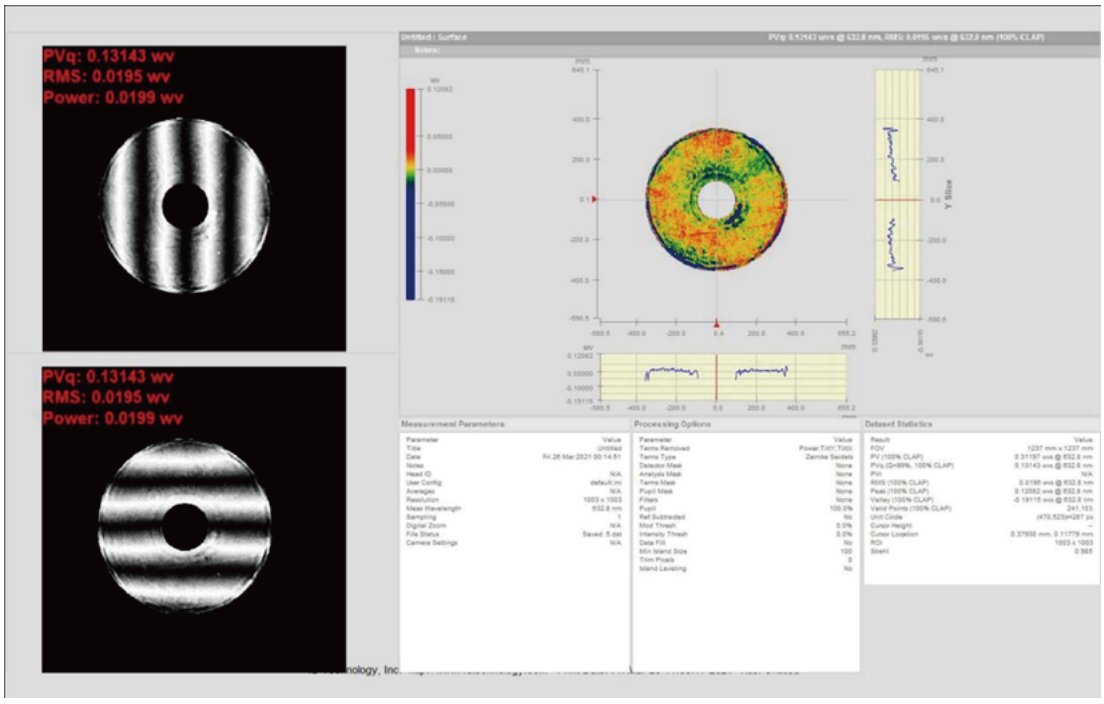
SiC on-axis parabolic primary mirrors



Parameters:

Name	Inspection item	Inspection result	Inspection item	Inspection result
1236mm SiC primary mirror	Flatness of surface A	0.0500mm	Coaxiality between center hole and outer circle	⊙0.0413mm
	Outer roundness	0.0145mm	Diameter of reflecting surface	Φ1220.37mm
	Outer diameter	Φ1236.0636mm	Flatness of ground reflecting surface	0.0082mm
	Perpendicularity between outer circle and surface A	⊥0.0129mm	Parallelism between ground reflecting surface and surface A	0.025mm
	Outer cylindricity	0.0329mm	Effective clear aperture	Φ1200mm
	Center hole diameter	Φ289.9617mm	Top’ s radius of curvature (R)	3000.2688mm
	Perpendicularity between center hole and surface A	⊥0.0019mm	Aspherical coefficient K	-1
	Cylindricity of center hole	0.0111mm	Coaxiality between reflecting surfaces optical axis and outer circle	⊙0.1000mm
	Total thickness	130.08mm、130.00mm、130.06mm、130.03mm		

Interferometer Test Report :

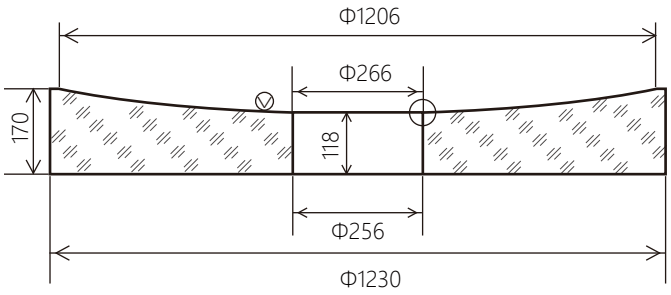


Surface Accuracy

λ/7 PV

λ/50 RMS

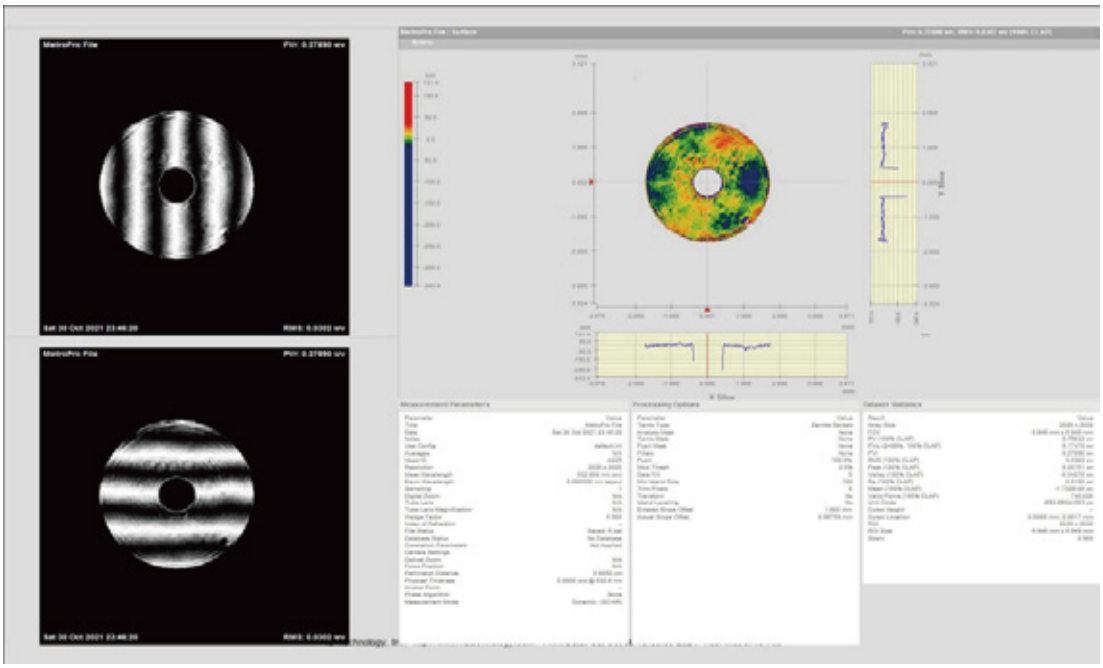
On-axis parabolic primary mirrors



Parameters:

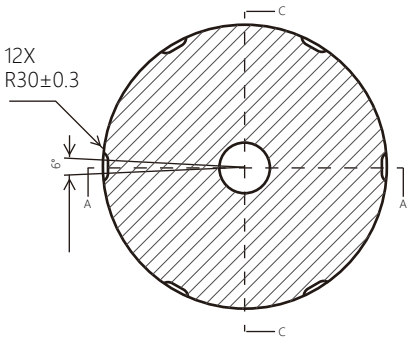
Name	Inspection item	Inspection result	Inspection item	Inspection result
1230mm Zerodur parabolic primary mirror	Outer diameter	Φ1229.8370mm	Diameter of center step hole	Φ0.0413mm
	Depth of center hole	117.7854mm	Cylindricity of center hole	⊙1220.37mm
	Surface Quality	60/40 S&D	Perpendicularity between center hole and surface A	0.0082mm
	Clear aperture	Φ1200mm	Flatness of surface A	0.025mm
	K value	-0.9992	Perpendicularity between optical axis and surface A	⊥-1.00005mm
	Edge thickness	169.7040mm	Coating	20nm ~ 1700nm: 91.835%; 1064nm: 96.887% 420nm ~ 800nm: 91.840%
	Diameter of center hole	Φ256.3753mm		
	Aperture of reflecting surface	Φ1209.3896mm		

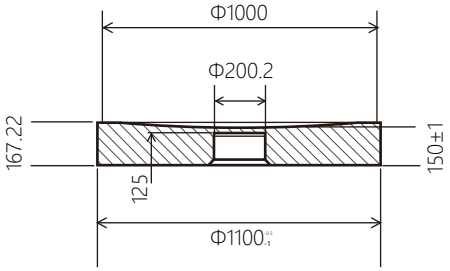
Interferometer Test Report :



Surface Accuracy
λ/3 PV
λ/31 RMS

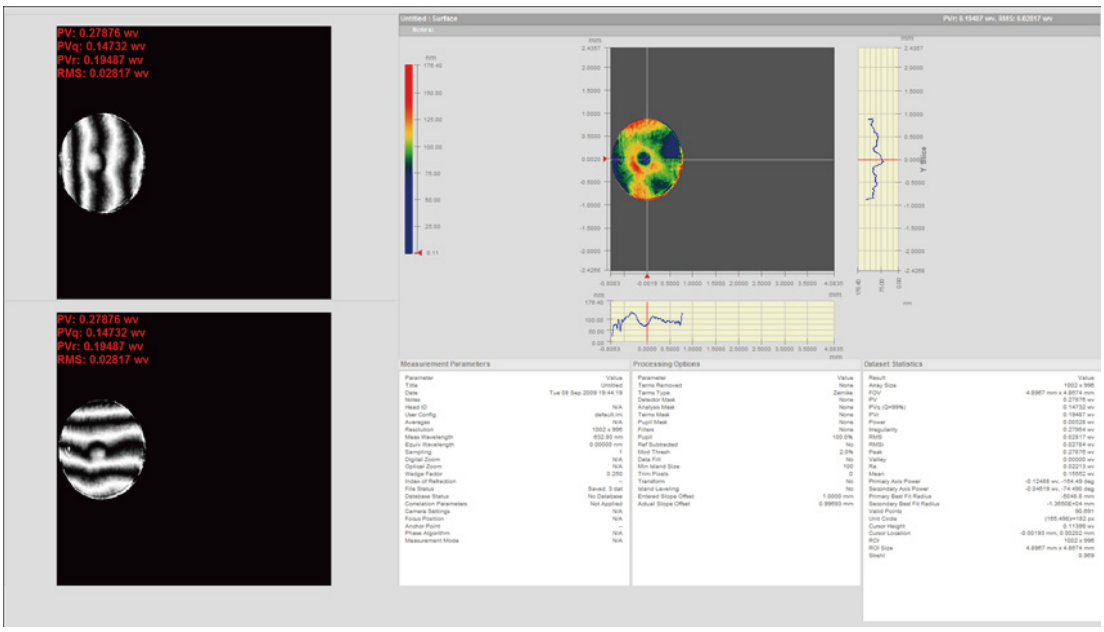
Off-axis parabolic primary mirror





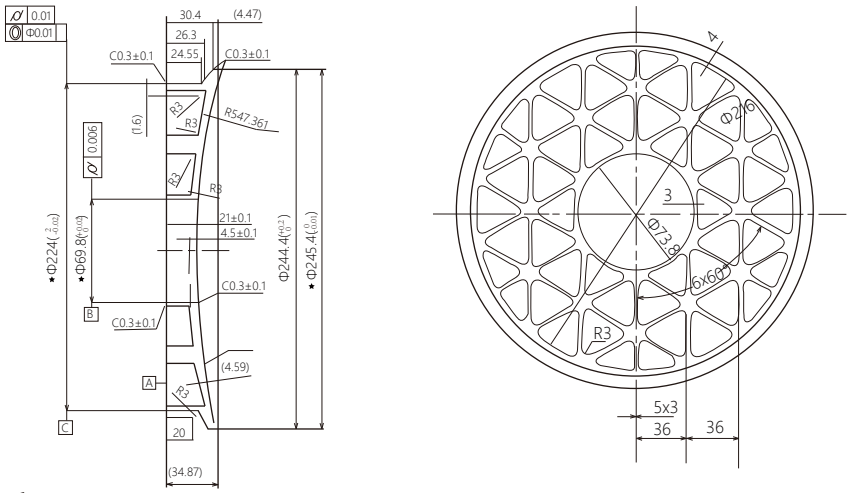
Name	Inspection item	Inspection result	Inspection item	Inspection result
1100mm off-axis parabolic primary mirror	RMS	0.02817λ	Thickness between center of surface R2 and back hole	24.9mm
	Outer diameter	Φ1099.44	Coaxiality between outer circle and reference surface A	⊙0.05mm
	Diameter of surface R2	Φ1070mm	Cylindricity of reference surface A	0.02mm
	Clear aperture	Φ1040mm	Thickness of side groove	20.7mm
	Diameter of back hole	Φ200mm	Location of side groove	60.64mm
	Depth of back hole	125mm	R	7709.4963mm
	Edge thickness	167.12mm	Off-axis distance	1010mm
	Center thickness	149.90mm	Surface Quality	60-40 S&D

Interferometer Test Report:



Surface Accuracy
λ/3 PV
λ/35 RMS

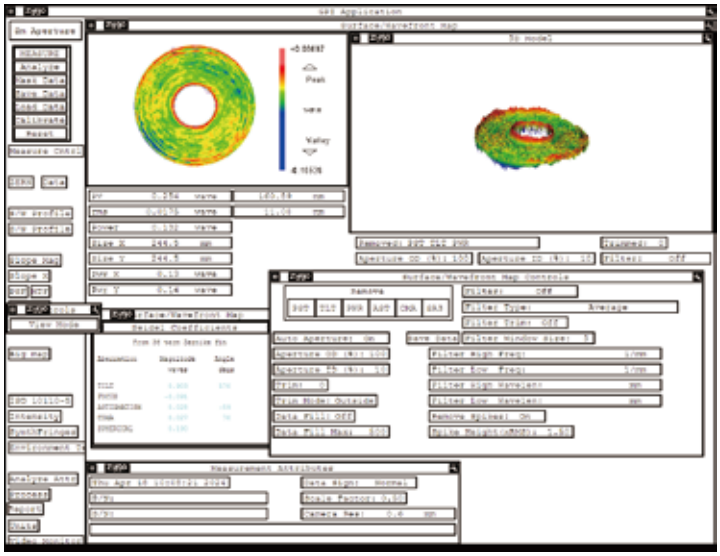
Lightweight on-axis Hyperbolic Mirror



Parameters:

Name	Inspection item	Inspection result (mm)	Inspection item	Inspection result (mm)
245 mm Lightweight on-axis Hyperbolic Mirrorr	Effective through-hole caliber	Φ70.4mm-Φ244.5mm	K	-2.936±5.7E-4
	Medium hole caliber	Φ69.816mm	R	525.05lmm
	Outer Circle	Φ246.326mm	Surface Quality	60/40 S&D
	Backside step outer circle	Φ223.980mm	Surface roughness	0.600nm:0.6l5nm:0.557nm: 0.605nm;0.700nm;0.595nm.
	Center thickness	21.082mm	Datum A polished	2
	Cylindricity of center hole	0.002mm	Angle between optical axis and datum A	90°-7.6"
	224 Cylindricity	0.010mm	Mirror eccentricity	0.010mm
	224 Coaxiality	Φ0.004mm	Appearance	No defects such as chipping knocking, chipping, etc.
	Base C test length	23mm	Weight	1079g
	Surface Accuracy	0°: RMS: 11.08nm、90°:RMS:11.04nm 180°:RMS:11.78nm、270°:RMS:11.66nm		

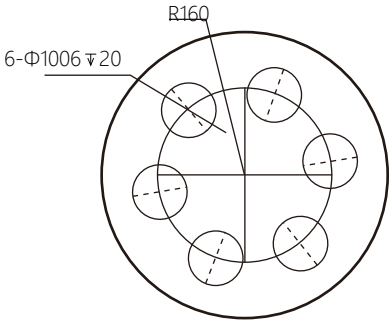
Interferometer Test Report:

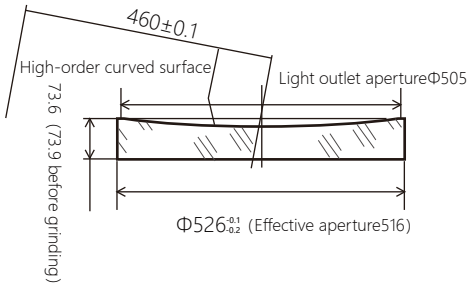


Surface Accuracy

λ/57 RMS

High-order aspheric primary mirror

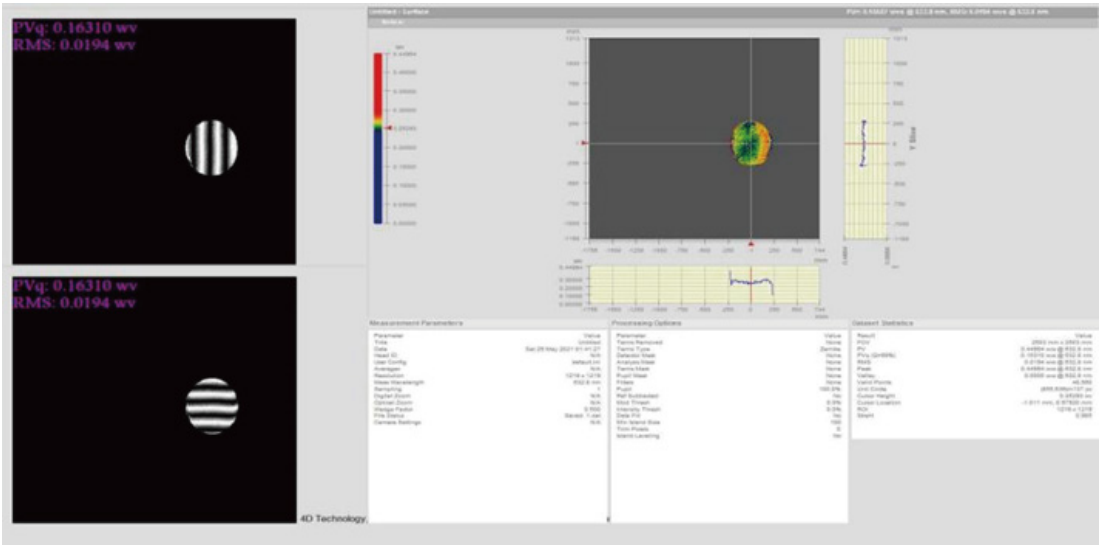




Parameters:

Name	Inspection item	Inspection result	Inspection item	Inspection result
526mm high-order aspheric primary mirror	Outer diameter	525.9126mm	Center thickness	60.9572mm
	Clear Aperture	Φ516mm	Top’ s radius of curvature	2348.756mm
	Surface Quality	60/40 S&D	K value	according to the requirement
	Edge thickness difference	0.0157mm	Off-axis distance	460.0mm
	Edge thickness	75.0065mm	Diameter of back hole	Φ100.0mm
			Depth of back hole	20.0mm

Interferometer Test Report:

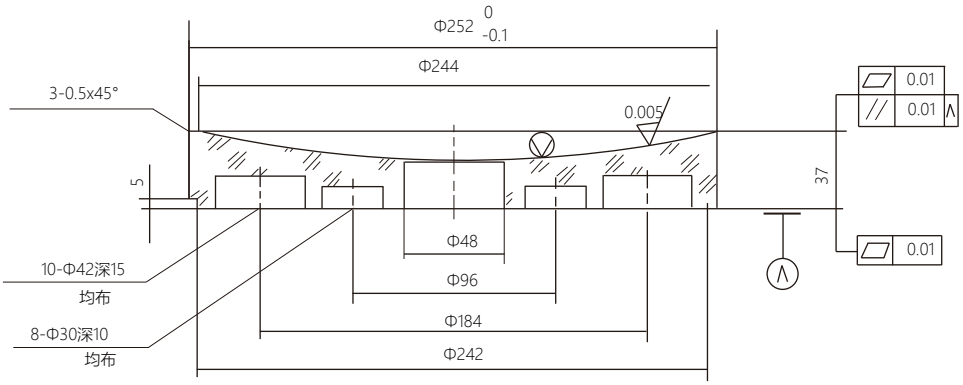


Surface Accuracy

λ/6 PV

λ/51 RMS

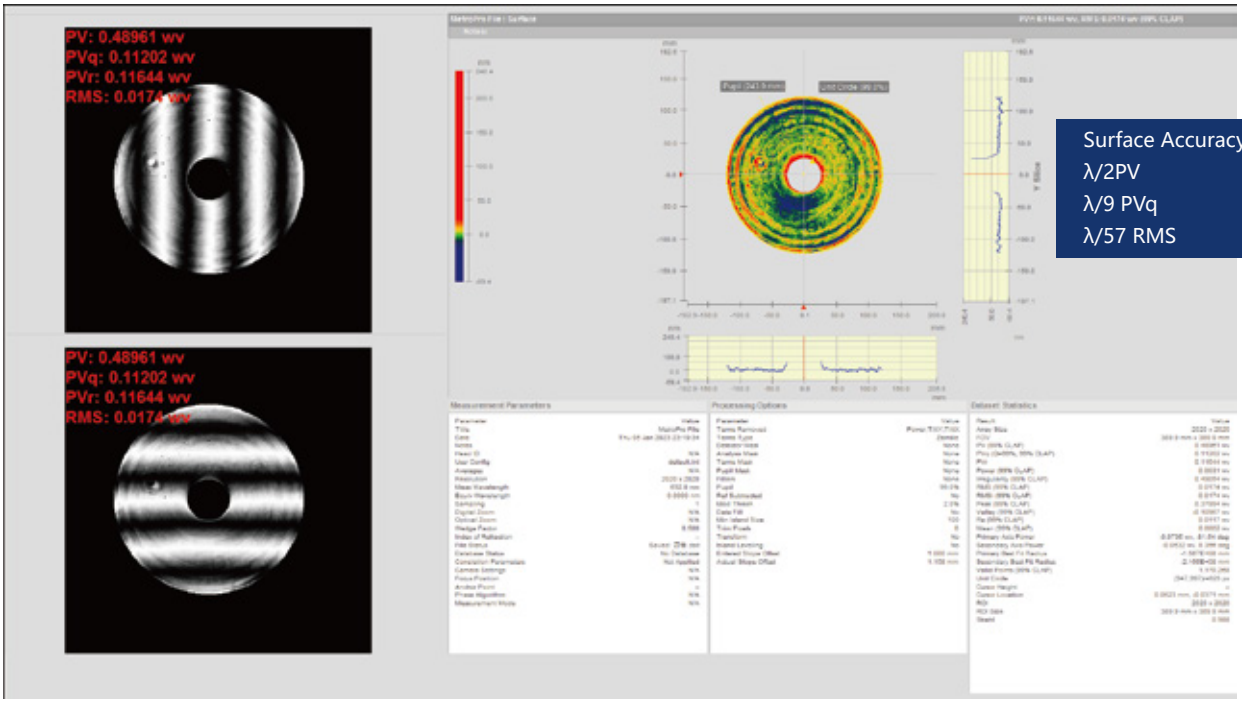
Lightweight high order aspheric mirror



Parameters:

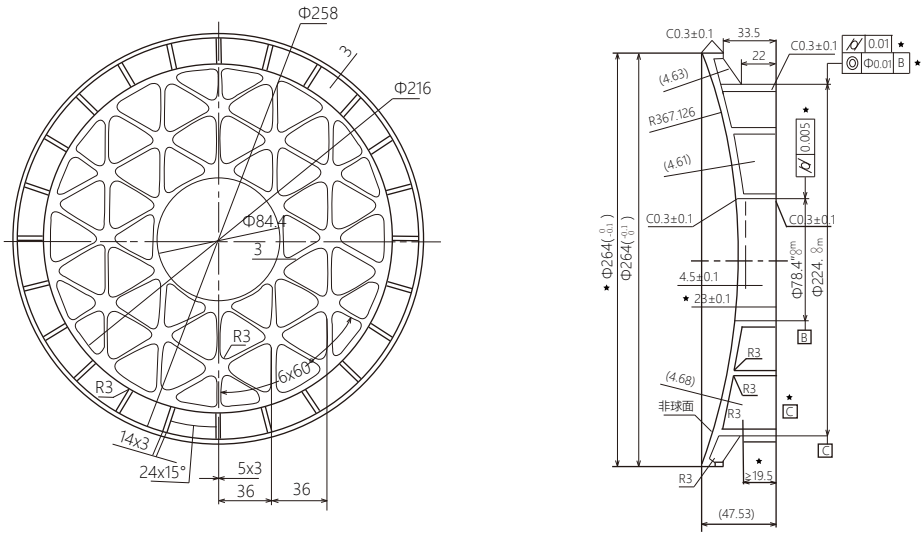
Name	Inspection item	Inspection result	Inspection item	Inspection result
252mm Lightweight high order aspheric mirror	cylindrical diameter	Φ251.98mm	Backside table depth	4.9021mm
	Mirror Diameter	Φ246mm	Eccentricity of the optical axis to the cylindrical axis	0.01mm
	Center Hole Diameter	Φ47.985mm	Perpendicularity between center hole and surface A	4.8 ″
	Lightweight hole 1	8-Φ29.87mm depth 9.88mm	Vertex Radius	564.997mm
	Lightweight hole 2	10-Φ42.094mmdepth 14.89mm	Face flatness	0.005mm
	Lightweight Hole Pitch 1	Φ96.075mm	Platform parallelism to A	0.0052mm
	Lightweight Hole Pitch 2	Φ183.97mm	Surface A flatness	0.006mm
	Back Circle Diameter	Φ241.973mm	Clear Aperture	Φ244mm
	Total thickness	37.21mm	Surface Quality	60-40 S&D

Interferometer Test Report:



Surface Accuracy
λ/2PV
λ/9 PVq
λ/57 RMS

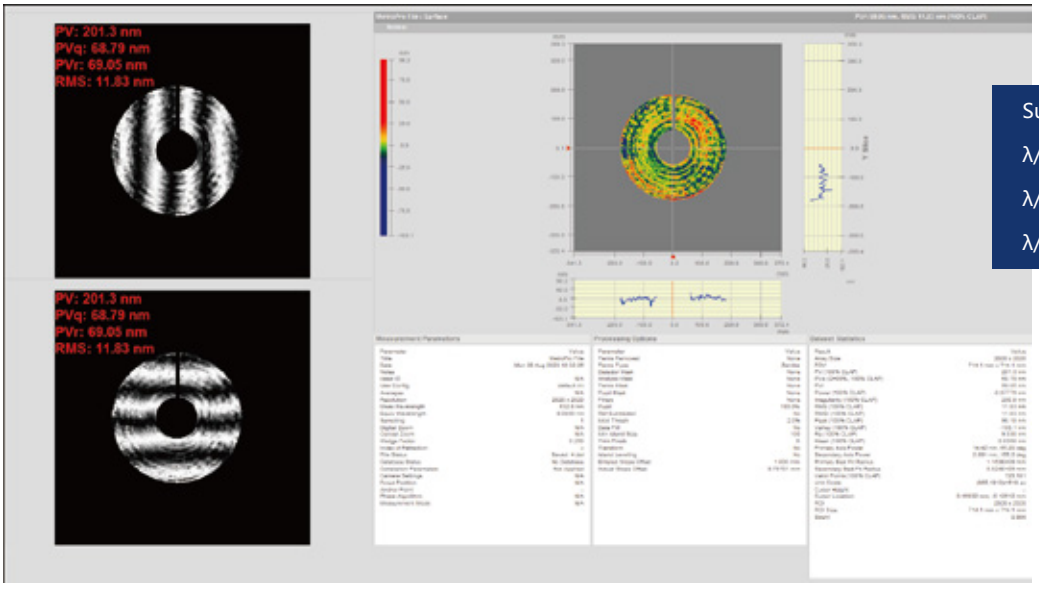
Lightweight on-axis ellipsoidal primary mirror



Parameters:

Name	Inspection item	Inspection result	Inspection item	Inspection result
264mm Lightweight on-axis ellipsoidal primary mirror	Effective through-hole caliber	Φ81-Φ263mm	k	-0.74989
	Medium hole caliber	Φ78.4087mm	Vertex radius of curvature R	-352.848mm
	Outer Circle	Φ263.9386mm	Surafce Quality	60-40 S&D
	Backside step outer circle	Φ223.9708mm	Surface roughness	0.602nm，0.778nm，0.576nm
	Center thickness	22.9964mm	Datum A polished	Aperture number:3
	Cylindricity of center hole	0.0040mm	Angle between optical axis and datum A	89°59′52.44″
	224 Cylindricity of outer circle	0.0037mm	Mirror eccentricity	Optical axis eccentricity:0.009mm
	224 External Cylindricity	0.0049mm	Weight	1349.5g
	Benchmark C test length	21.8mm	Surface Accuracy	PVq：68.79nm RMS：11.83nm

Interferometer Test Report:



Surface Accuracy

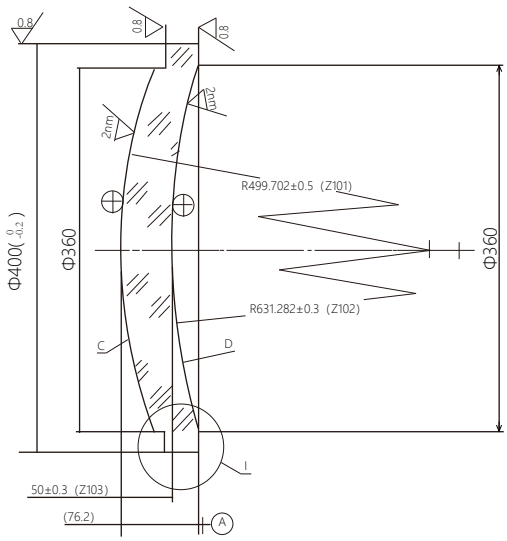
λ/3 PV

λ/9 PVq

λ/51 RMS

Large Optcial Lens

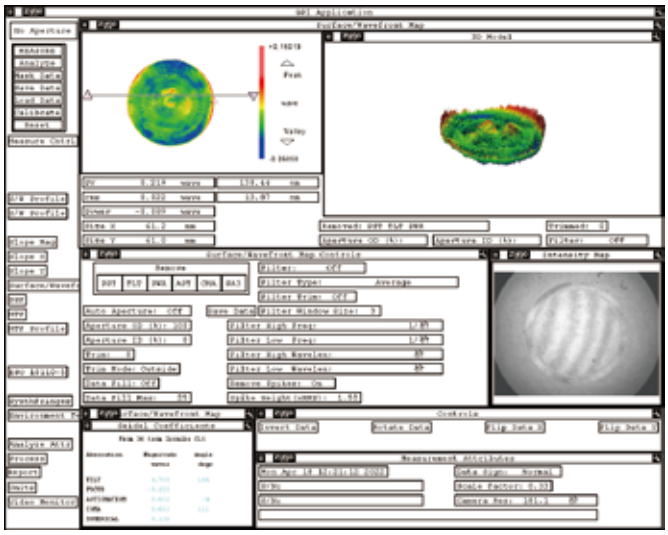
High-order aspherical lens



Parameters:

Name	Inspection item	Inspection result	Inspection item	Inspection result
High-order aspherical lens	Material	Fused Silica (Class 7080-0C)	C-side Clear Aperture	Φ353mm
	Diameter	Φ399.9190mm	D-side Clear Aperture	φ358mm
	C-side Diameter	Φ359.9251mm	Edge Thickness	34.5570mm
	D-side Diameter	Φ371.2116mm	Equal thickness difference	0.0051mm
	Total thickness	77.4738mm	Surface Quality	60/40 S&D
	Centre thickness	50.0299mm	C-side R	499.6860mm
			D-side R	631.2722mm

Interferometer Test Report:

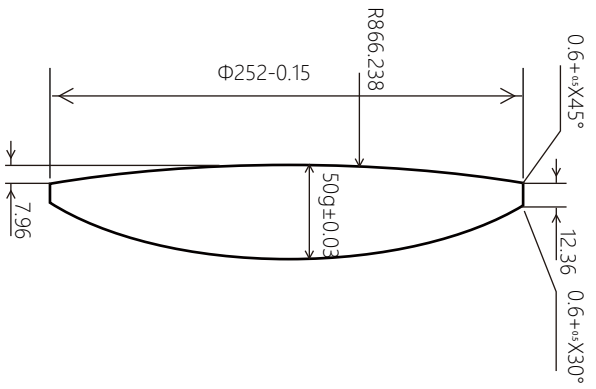


Surface Accuracy

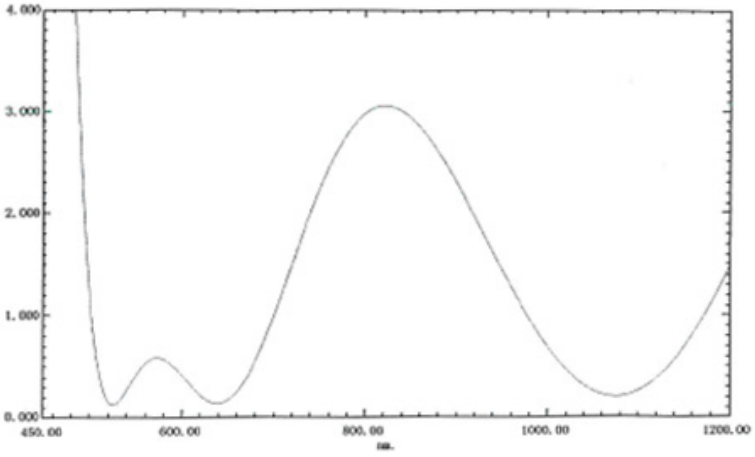
λ/4 PV

λ/45 RMS

Spherical lens



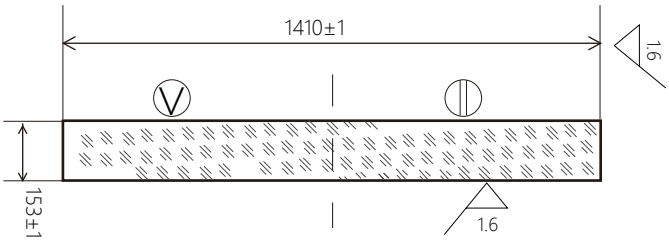
Name	Inspection item	Inspection result	Inspection item	Inspection result
252mm spherical lens	Outer diameter	Φ251.9434mm	N	0.5
	Edge thickness	12.36mm	ΔN	0.25; 0.25
	Center thickness	50.0317mm	Surface quality	60-40 S&D
	R1	866.1178mm	Clear aperture	Φ246mm
	R2	293.40792mm		



No.	Wavelength (nm)	Reflectivity	描述
1	518.00	0.129	
2	532.00	0.107	
3	637.00	0.086	
4	656.00	0.148	
5	1072.00	0.119	
6	1085.00	0.148	

Optical Flat

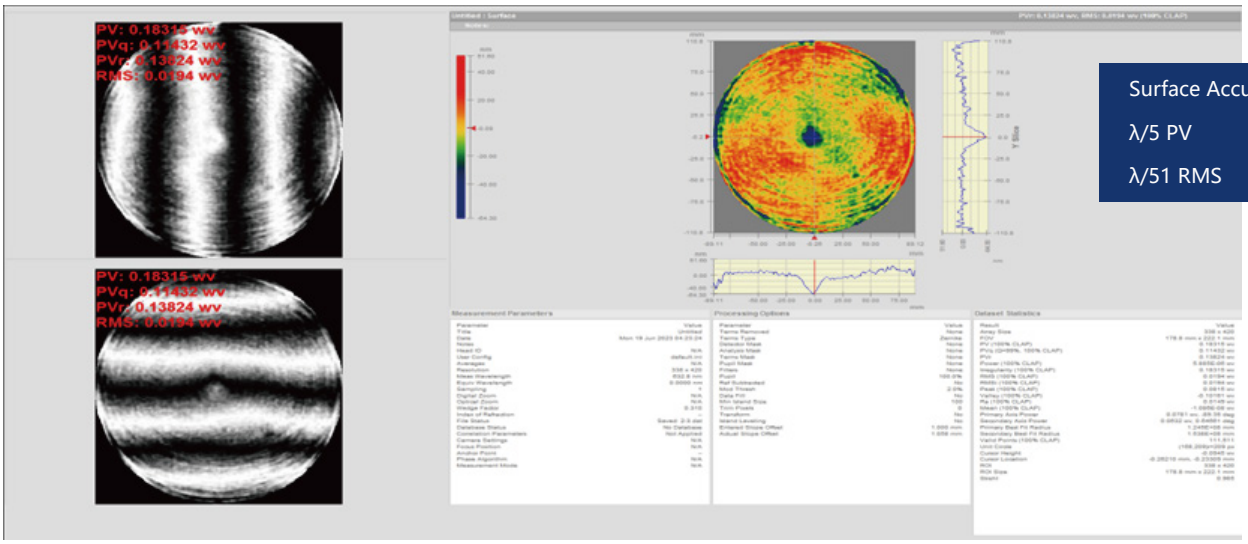
for interferometer testing



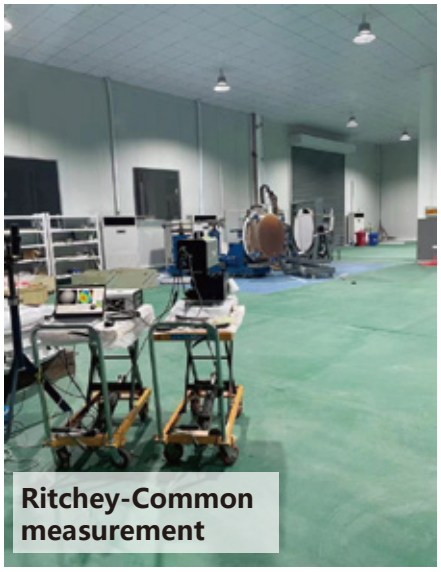
Spherical lens

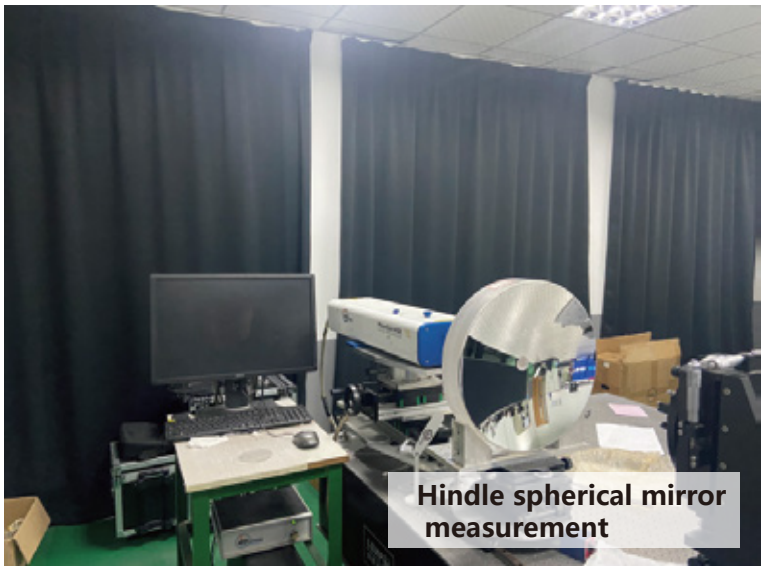
Name	Inspection item	Inspection result	Inspection item	Inspection result
1410mm standard Optical Flat	Outer diameter	Φ1409.4mm	Pitch adjustment	Range: ±5°; precision: 0.01°
	Thickness	154mm	Height adjustment	±5cm
	Clear aperture	Φ1400mm	Surface accuracy	0.0199λ, 0.0197λ, 0.0200λ, 0.0189λ, 0.0199λ, 0.0198λ, 0.0194λ, 0.0197λ,
	Roughness	1nm		
	Azimuth adjustment	Range: ±10°; precision:0.01°	Coating:	Protective Al Coatings

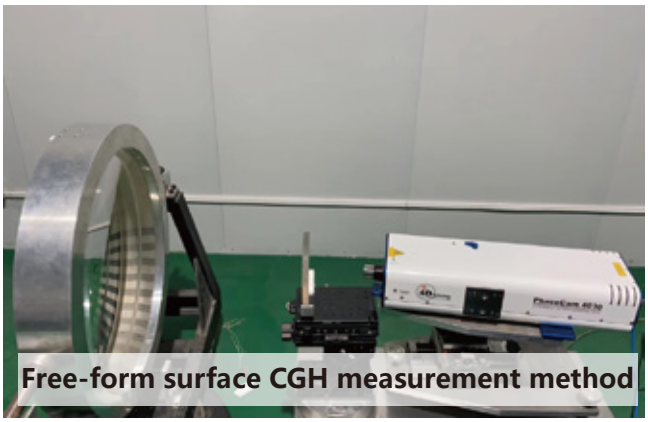
Interferometer Test Report:

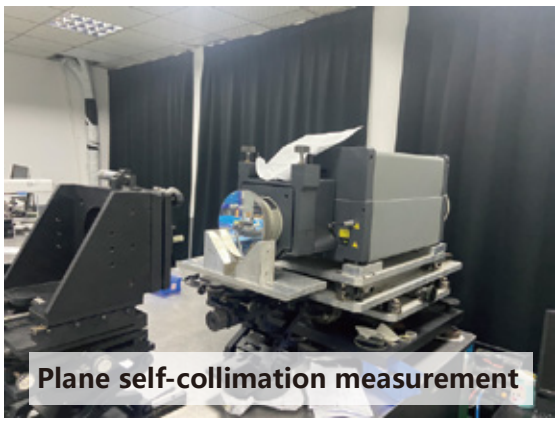


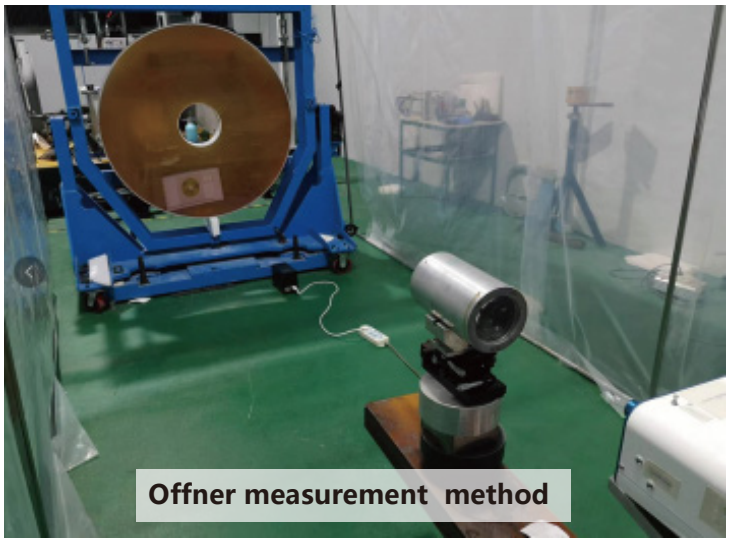
Inspection Methods


Ritchey-Common measurement


Hindle spherical mirror measurement


Free-form surface CGH measurement method


Plane self-collimation measurement


Offner measurement method

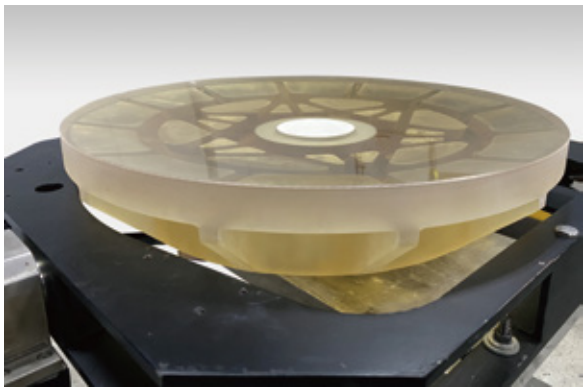

Vertical inspection tower

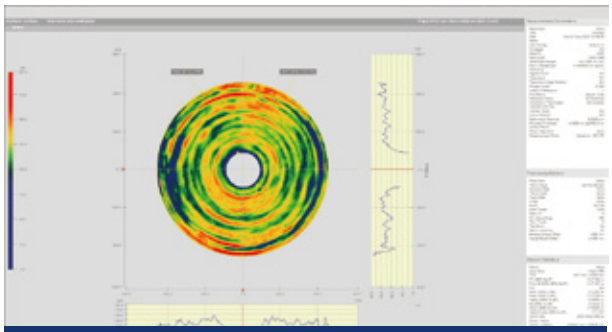
Lightweight Producing Cases

Over the years, we have gained extensive experience in lightweight structural design, finite element analysis, and the manufacturing of specialized and lightweight mirrors. We have successfully processed a wide variety of mirrors, spanning different shapes and apertures, including lightweight and non-standard designs.

Our products are engineered with lightweight components, optimized through mechanical analysis. We utilize finite element analysis, coupled with our historical expertise, to provide tailored lightweight design solutions that meet our customers' specific weight reduction requirements.

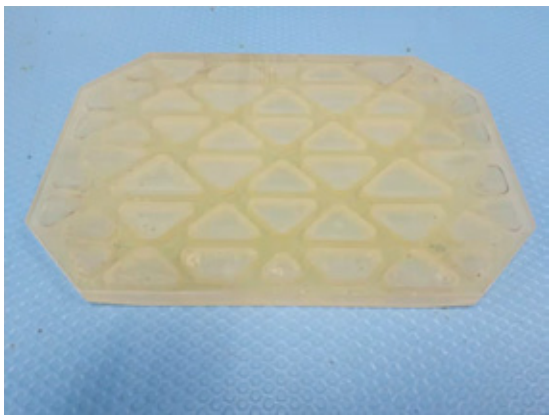
Φ600mm Lightweight aspherical mirror

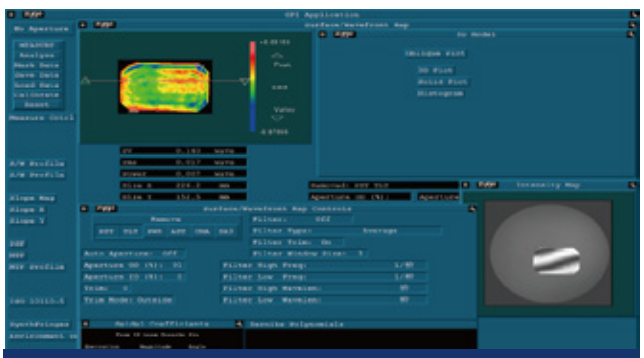




PVq=0.17127λ; RMS=0.0295λ PVq=1/5λ; RMS=1/33λ

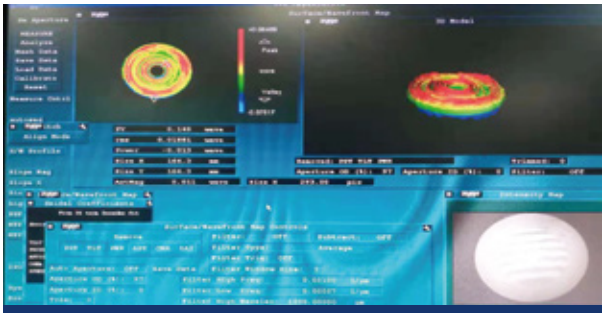
*290*210mm Special-shaped mirrors*





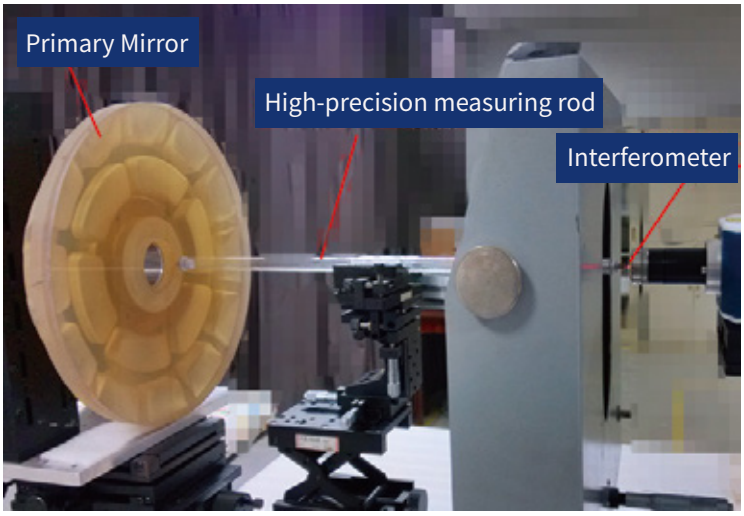
PV=0.14λ; RMS=0.017λ PV=1/7λ; RMS=1/58λ

Φ206 Lightweight primary mirror



PV=0.140λ; RMS=0.01881λ PV=1/7λ; RMS= 1/53 λ

Φ354mm Lightweight parabolic mirror



Material: Zerodur

VVertex radius: 1111.1mm

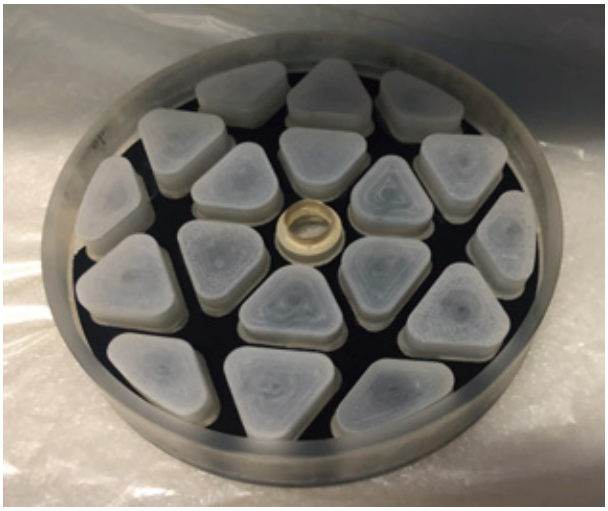
Conic constant (k) : -1

Detection equipment: 4D dynamic interferometer

Requirement: RMS λ /40 (λ=632.8nm)

Lightweight weight loss ratio: 30%

Φ200mm Lightweight parabolic mirror



Material: Fused Silica

Vertex radius: 380 mm

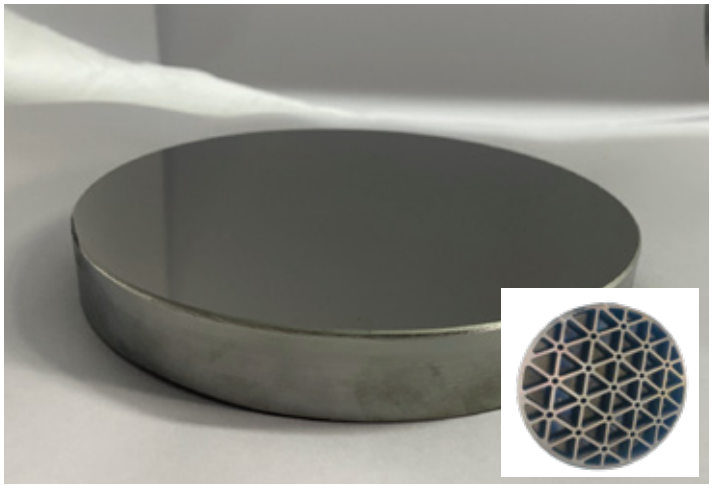
Conic constant (k): -1

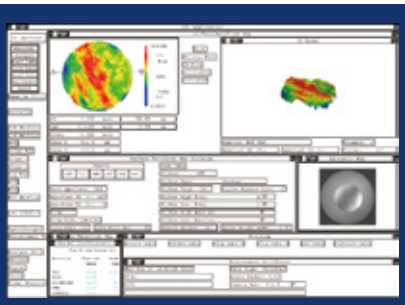
Testing equipment: ZYGO interferometer

Requirements: RMS λ /50 (λ=632.8nm)

Weight reduction ratio: 30%

Φ200mm SiC Lightweight Optical flat



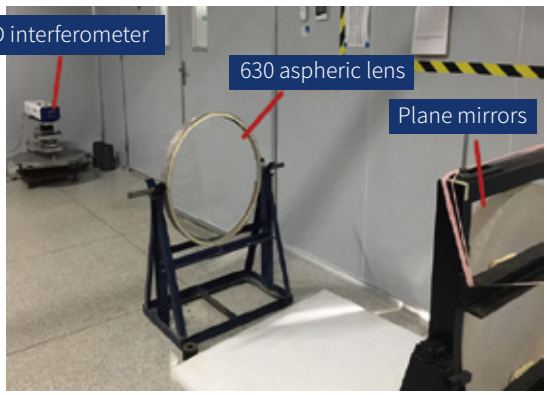


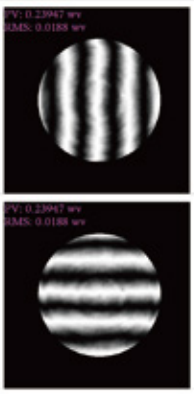
Material: Silicon Carbide

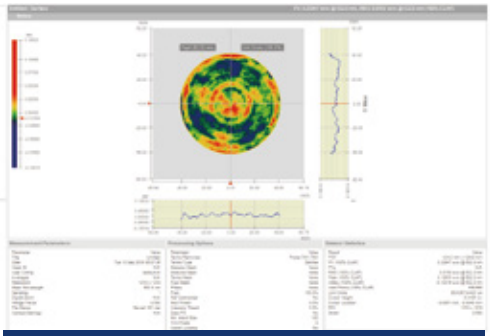
Testing equipment: ZYGO interferometer

Requirements: λ /10 PV (λ=632.8nm)

Φ630mm Aspheric lenses

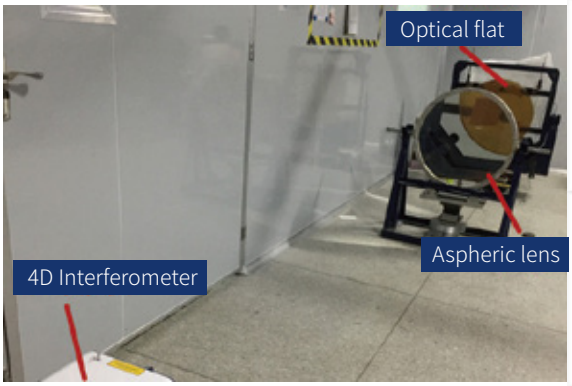


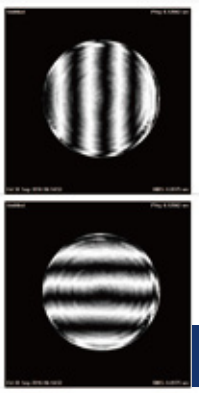


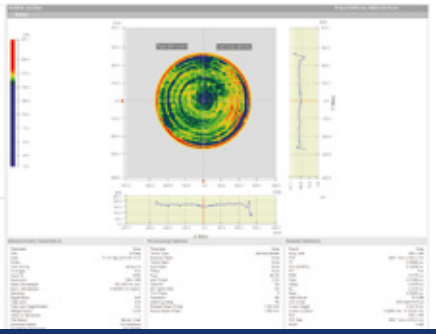


PV λ /4 (λ=632.8nm)

Φ530mm Aspheric lenses

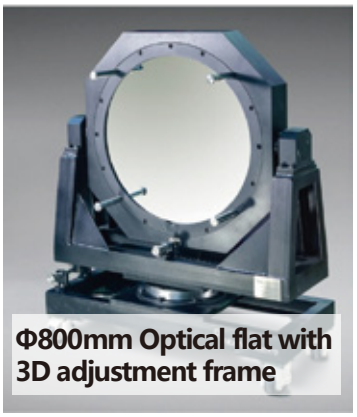






PV λ/6 (λ=632.8nm)

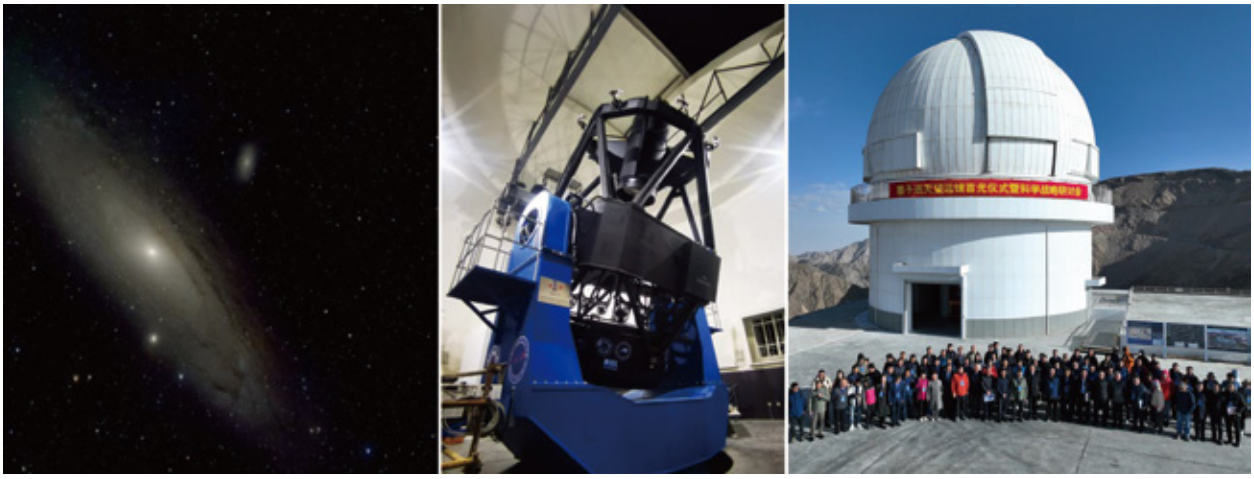

Φ1100mm Flat mirror with 2D adjustment frame


Φ800mm Optical flat with 3D adjustment frame

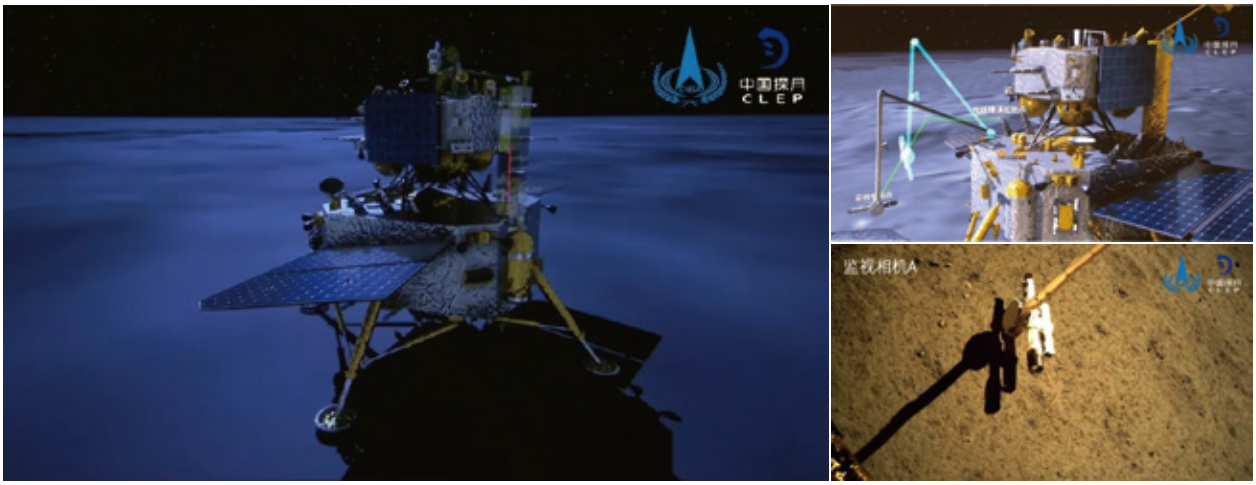

Φ630mm Flat mirror with 2D adjustment frame

Application

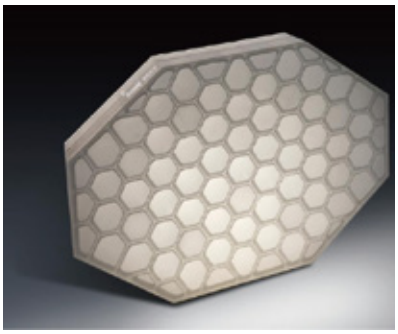
Correction Lens for the "Mozi" survey telescope



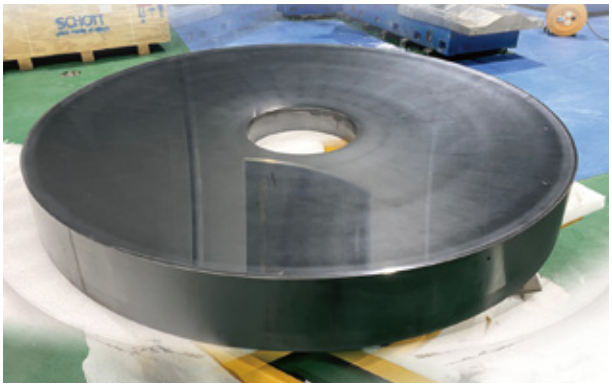
Optics for Chang'e 6



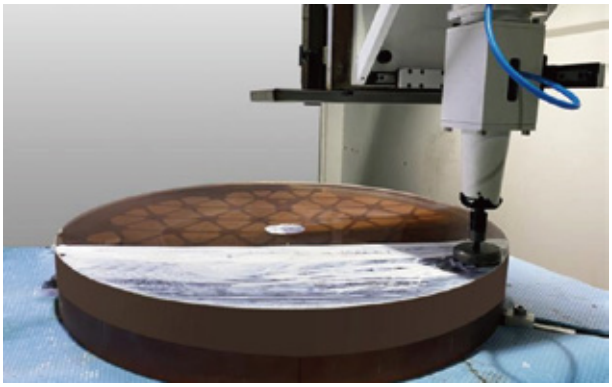
Producing Capabilities



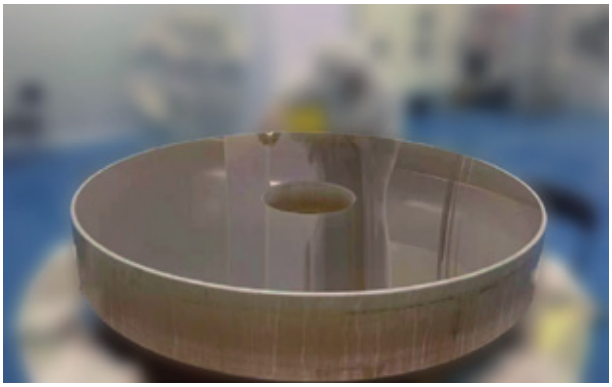
Medium to Large aperture optical components
Product Type: Aspheric Lens， Aspheric Mirror（including Parabolic、Hyperbolic、Elliptical and High order aspheric）, Spherical Mirror, Optical Flat, Freeform Surfaces
Structural form :on-axis, off-axis
Processing: lightweight, or common surface
Size range: φ10mm---φ2000mm
Surface accuracy: PV value up to λ/20（λ/10 for aspherics）
RMS can reach up to λ/100, λ=632.8nm
Finish: 40/20-80/60
Roughness: 0.4nm-5nm
Bands used: UV, visible, infrared
Material： Optical glass (e.g. K9, Fused Silica,Zerodur,ULE, Silicon, Silicon Carbide,Corning 7980, CaF2, ZnSe, ZnS,Ge etc.)



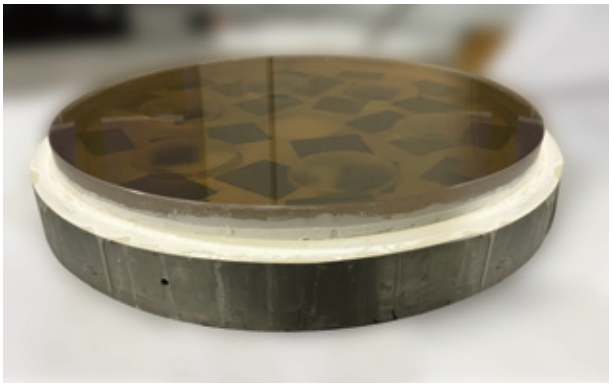
SiC Aspheric Mirror



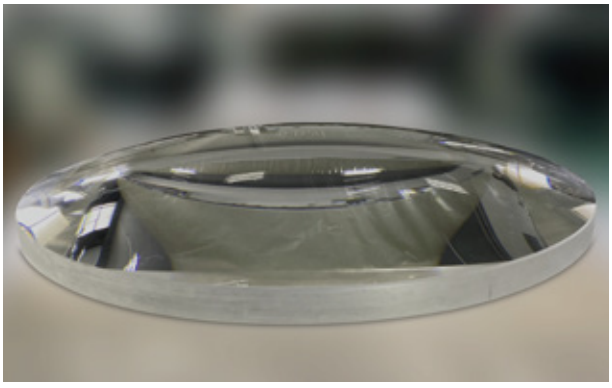
Off-axis high-order aspheric primary mirror



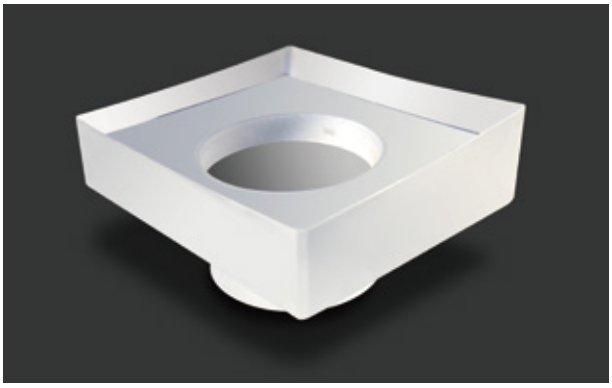
On-axis parabolic primary mirror



Off-axis Elliptical primary mirror

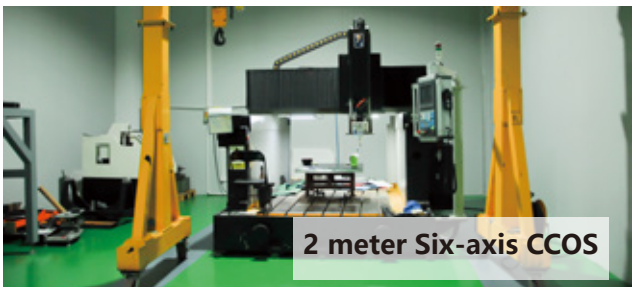


Spherical lens

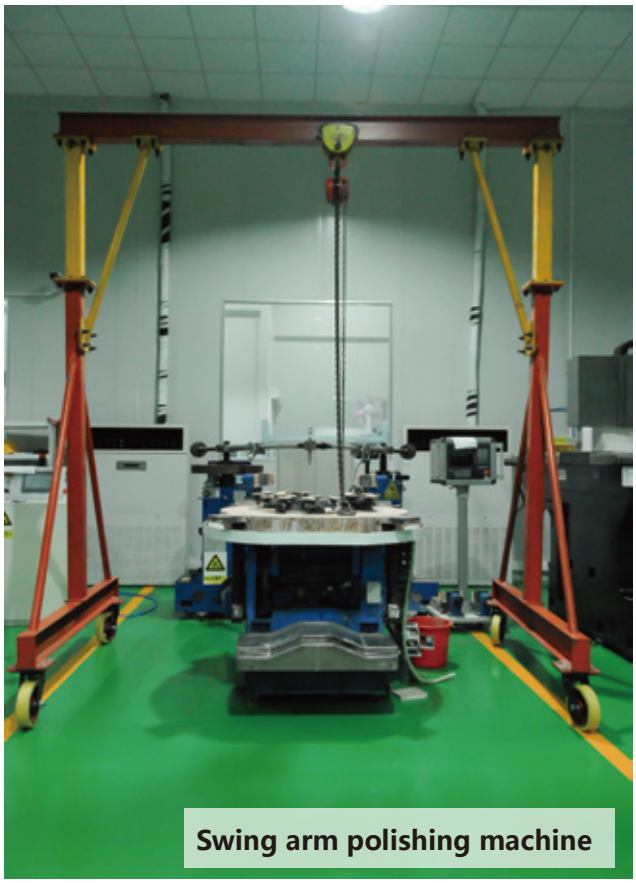


Off-axis quadrate Mirror


Five-axis CNC
engraving and milling machine


2 meter Six-axis CCOS


3m Continuous Planetary Polisher

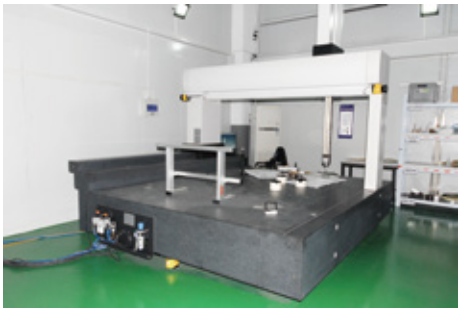

Swing arm polishing machine


NTG IBF300 – Ion Beam Figuring


1m airbag polishing system


CNC grinding and
polishing machine


2.2m coating machine

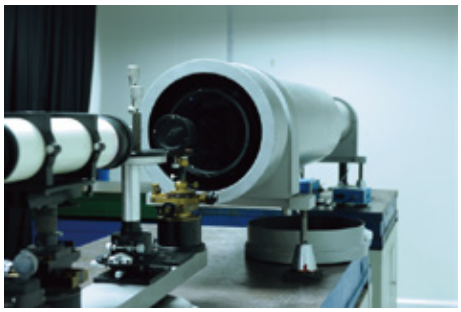


2.4m ZEISS PRISMO

600mm Plano Laser Interferometer

Taylor Hobson LUPHOScan non-contact profilometer

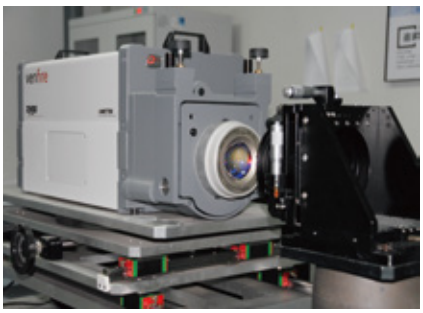
Satisloh Edge Grinder



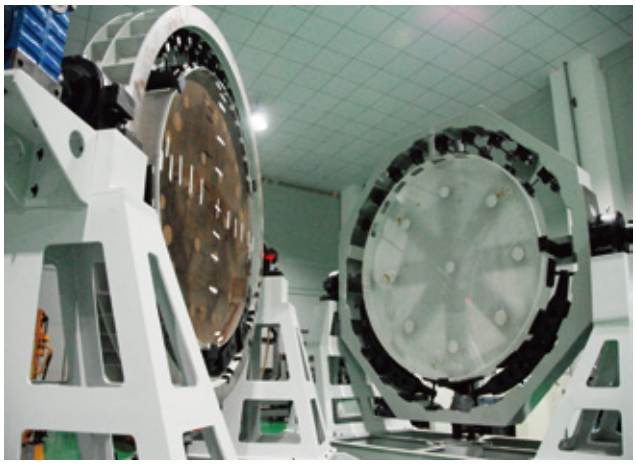
Collimator

4D Dynamic interferometer 6000

4D Dynamic interferometer 4020

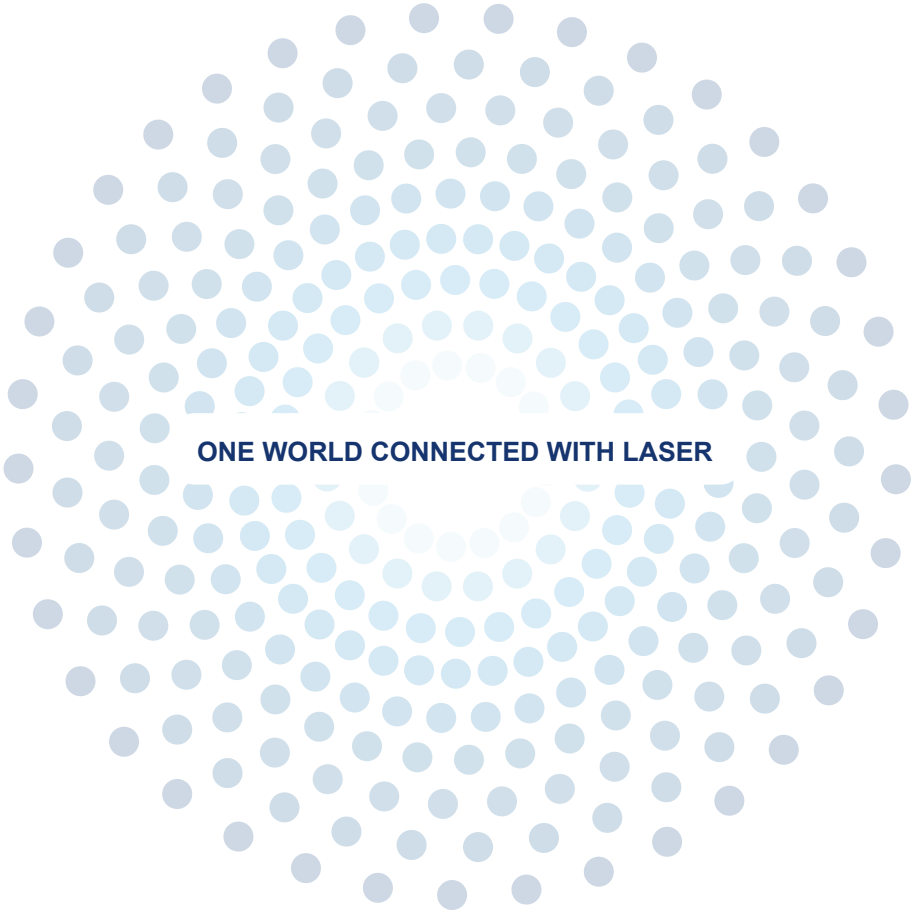


4” ZYGO Verifire™ laser interferometer



1.78m Hindle Mirror

3D adjusting bracket



Brochure series:

Ultra-precision Optical Elements
Precision Optical Lens Assembly
Large-size Precision Optical Elements
Precision Optical Coating Solution
Collimators
Satellite Laser Communication System Solution

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Email: alice.hsia@intaneoptics.com

Intane OPTICS® 英田光学

Precision Optical Coating Solution

Company profile

Nanjing Intane Optics was founded in 2003 by Professor Zhou Bifang, the former director of Nanjing Astronomical Instruments Research Center, the Chinese Academy of Sciences. Nanjing Intane Optics is a national high-tech enterprise with precision optical systems solutions at its core competency. The company boasts a team of experienced engineers in precision optical engineering, with proven technological capabilities ranging from complex system design, integration, assembly, testing to the manufacturing of key optical components.

Advanced optical elements are the core components that determine the performance of precision optical instruments. As technology and requirements develop, there are increasingly higher demands for the performance of advanced optical elements.

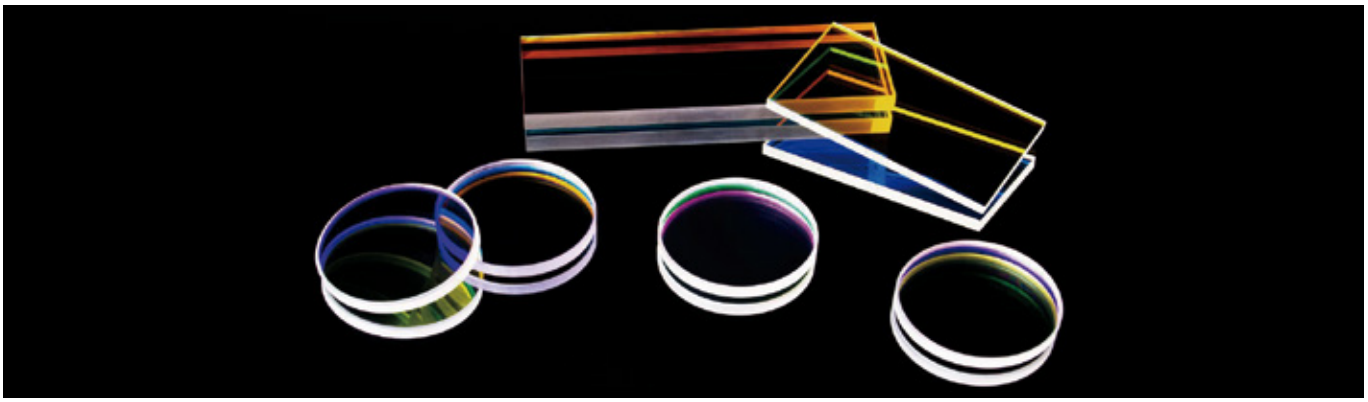
Nanjing Intane Optics is actively engaged in research on ultra-precision optical component processing technology. With internationally advanced polishing and testing equipment, combined with self-developed CNC equipment, our experienced technicians team is constantly taking on challenges of high-performance optical component manufacturing with increasing difficulty. We have achieved full-spectrum nano-scale processing accuracy in the manufacturing of optical aspherics, spheres, planes, cylinders, and windows. Through high-performance optical coating, our products feature long life, high reliability, high strength, and diversity of optical components.

Based on high-precision optical components, Intane Optics also has developed a series of high-precision optical testing instruments and equipment. Collimators of various aperture and specifications have a good reputation among customers. Intane Opics: Your trusted supplier for precision optical system solutions.

Contents

ONE WORLD CONNECTED WITH LASER

Products and application cases



Optical coating is for better transmissivity, reflection or polarization of optical elements. For each uncoated glass device, about 4% incident light on its surface is reflected. Antireflection coatings makes the percent smaller than 0.5%; high-reflecting dielectric coatings improves reflectivity to 99.5% or above. An optical coatings is made up of a thin material such as oxide, metal, or rare earth. Its performance depends on its layers, thickness, and refractive index differences among different layers.

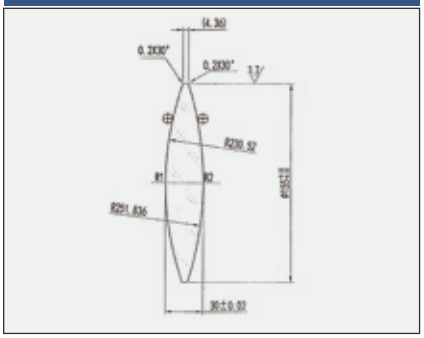
For the highest or lowest interference, the optical thickness of an optical coatings is usually a quarter of optical thickness (QWOT) of wavelength of the light used, or half of optical thickness (HWOT) of wavelength of the light used. Its high refractive index and low refractive index are alternate for the wanted interference effect.

Antireflection film

Application case 1:

Technical requirements: Antireflection coatings is coated on surfaces R1 and R2; the mean transmission in the 900nm to 2500nm wave band is equal to or more than 98% @ 632.8nm; Measured transmission of the antireflection coatings as below .

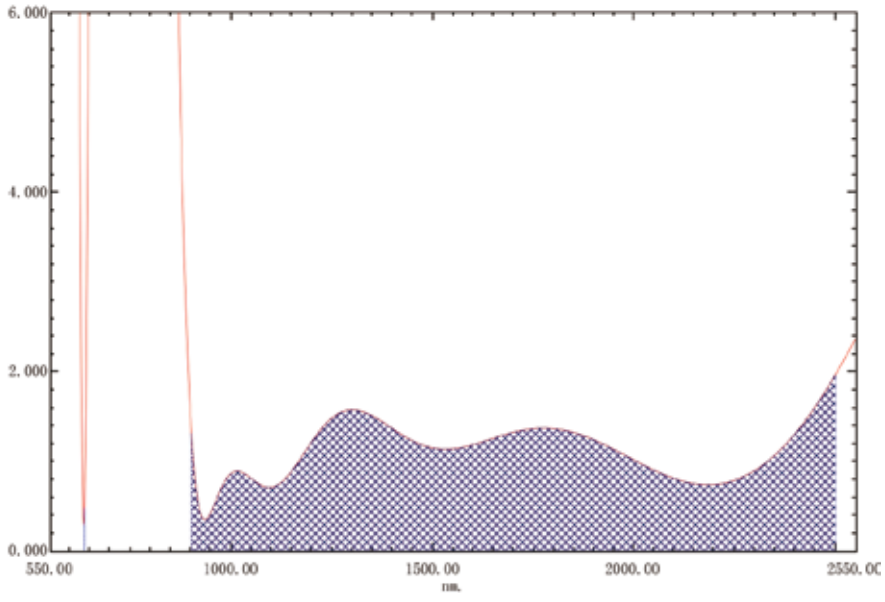
Product dimensions



Quality of optical glass	
Uniformity	H2
Fringe intensity	1C
Birefringence	2
Extent of bubble	1C
Light absorptivity	3

Precision of optical machining		
	R1	R2
Specimen precision △R	A	A
Radius deviation N	3	3
Partial deviation △N	0.3	0.3
Eccentricity c	0.02	0.02
Surface finishment MIL	Ⅲ	Ⅲ
Clear aperture Do	Φ152	Φ152

Spectral peak area report



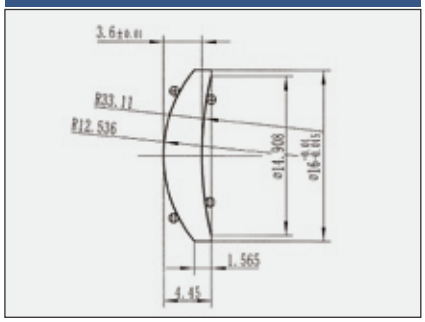
Zone	Color	Begin	End	Divisor	Area	Result	Description
1		633.00	634.00	1.000	0.413	0.413	
2		900.00	2500.00	1600.000	1780.646	1.113	
3							

Application case 2:

Technical requirements:

1. Anti-reflection coatings is coated; the wave band involved in coating is 486nm to 586nm; the single-side transmission is more than 99%.
2. Three layers of protective coatings are coated.
3. Outer coating C04-83 is no more than 0.01mm thick.

Product dimensions



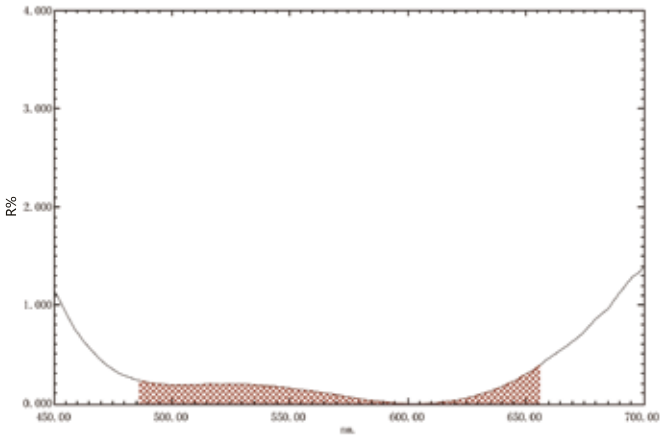
Material requirements

ΔN_d	1A
ΔV_d	1A
Optical uniformity	1
Optical absorptivity	1
Stress birefringence	1a
Fringe intensity	1a
Extent of bubble	1c

Element requirements

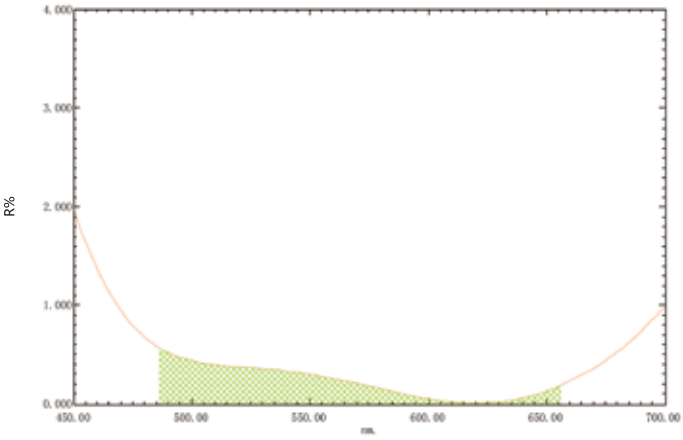
N	1
ΔN	0.1
ΔR	/
X	15''
Do	Φ14.5/Φ15

Spectral Peak Area Report (without Waterproof Coating)



Zone	Color	Begin	End	Divisor	Area	Result	Description
1		486.00	656.00	170.000	22.325	0.131	
2							

Spectral Peak Area Report (with Waterproof Coating)



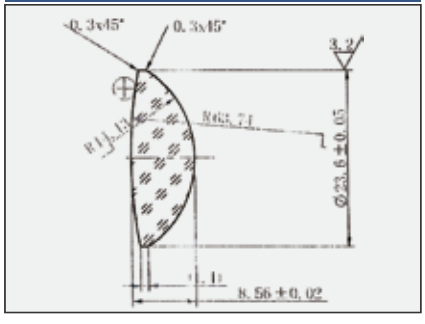
Zone	Color	Begin	End	Divisor	Area	Result	Description
1		486.00	656.00	170.000	37.298	0.219	
2							

Application case 3:

Technical requirements:

1. In the wavelength range of 400nm to 1000nm, the reflectivity R is 1% at most.
2. Trim of the lens is black.

Product dimensions



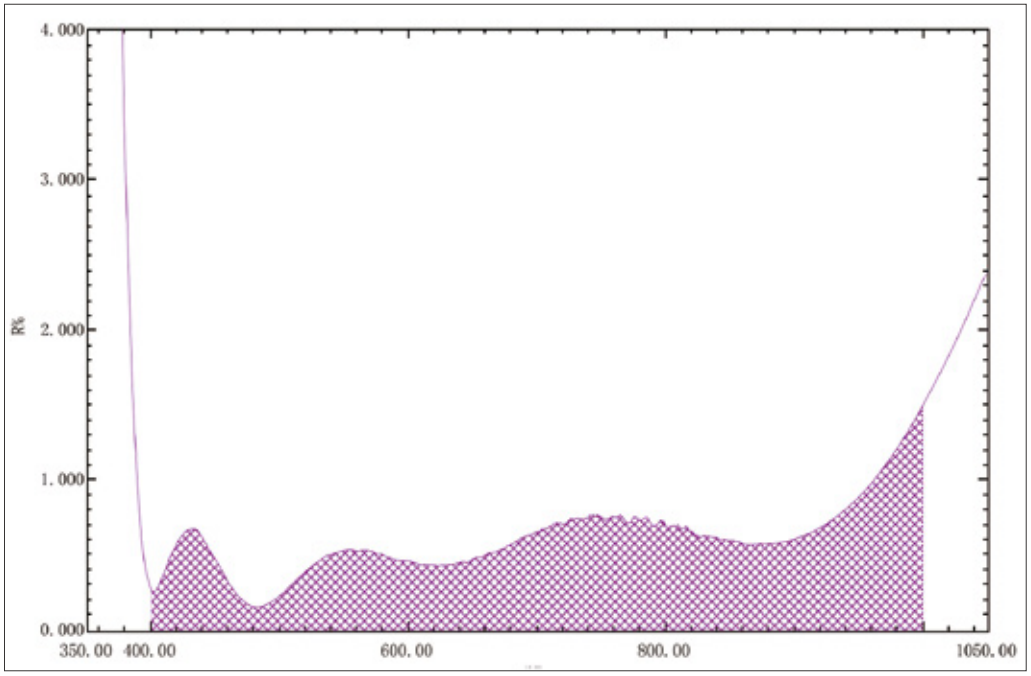
Material requirements

ΔN_d	28
ΔV_d	28
Optical uniformity	3
Optical absorptivity	2
Stress birefringence	2
Fringe intensity	1c
Extent of bubble	1c

Element requirements

N	3
DN	0.3
DR	A
C1	0.02
C2	0.02
B	1V
D_{01}	Φ33
D_{02}	Φ33

Spectral Peak Area Report



Zone	Color	Begin	End	Divisor	Area	Result	Description
1		400.00	1000.00	600.000	361.604	0.603	
2							

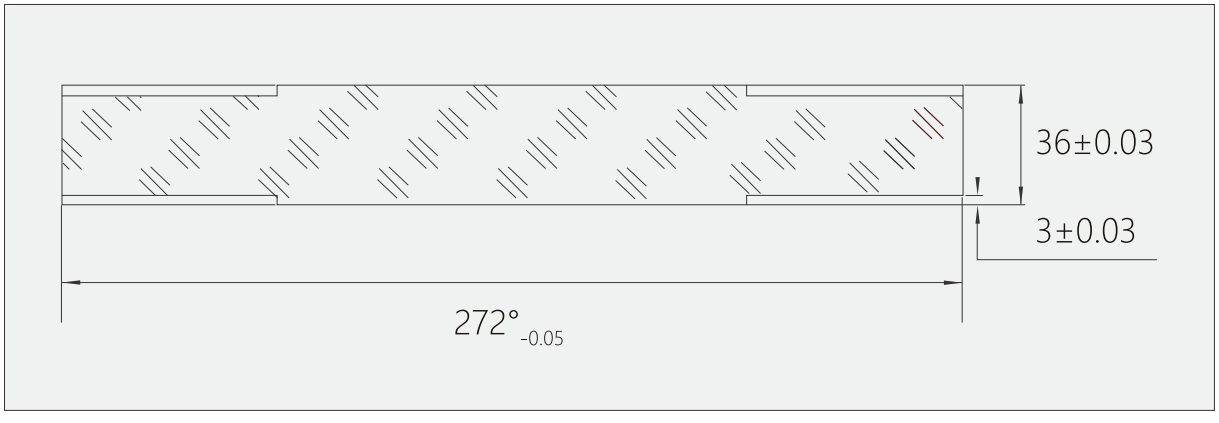
Beam splitting coatings

Application case 1:

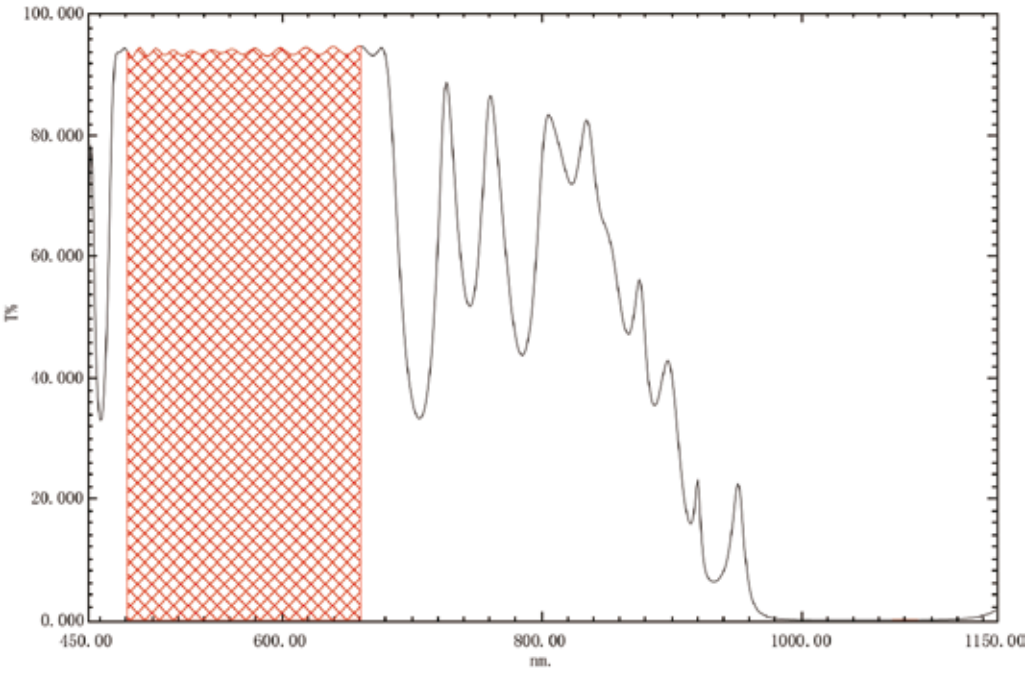
Technical requirements:

1. Spectral beam splitting beam is coated;
2. The angle of incidence is 45° ±1.5° ; the reflectivity R (1.070μm – 1.09μm) is more than 99.5%; the laser damage threshold should be more than 5000W/cm2; the absorptivity in the 1.08μm is less than 0.01%; the average transmissivity in the 480nm to 660nm wave band is more than 90%; the surface accuracy of the coated reflecting surface is better than λ/6 (P-V), λ/40 (RMS); the test wavelength is 632.8nm.
3. The power density is 5000W/cm^2.

Product dimensions

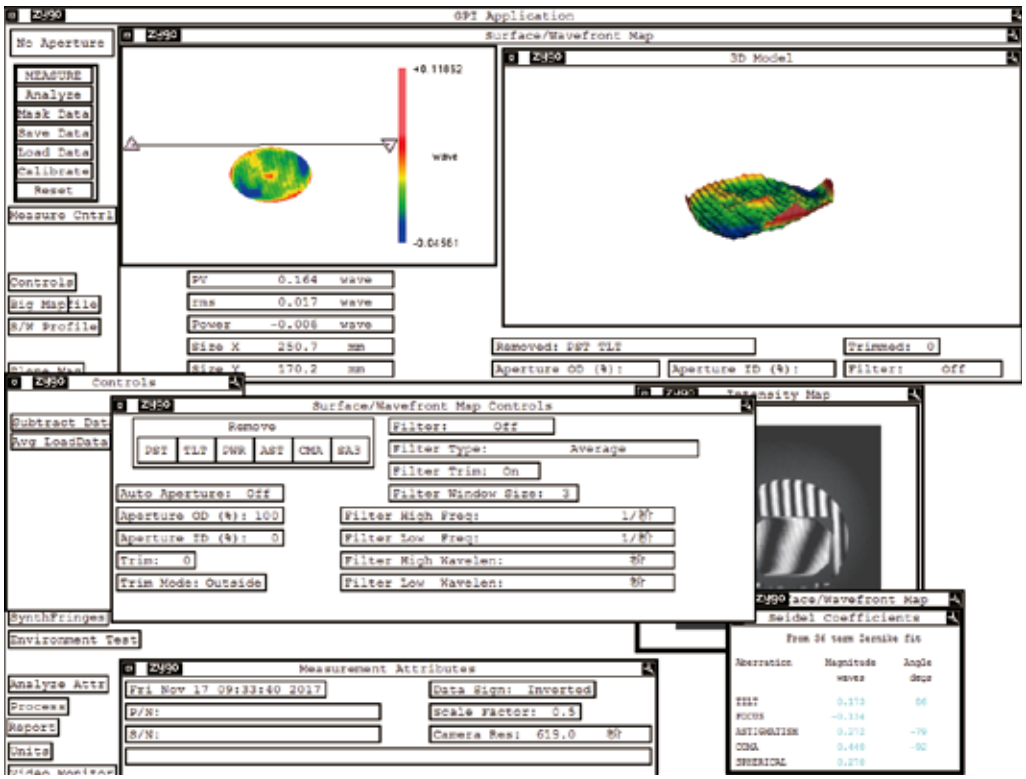


Spectral Peak Area Report



Zone	Color	Begin	End	Divisor	Area	Result	Description
1		480.00	660.00	180.000	16870.889	93.727	
2		1070.00	1090.00	20.000	0.936	0.047	
3							

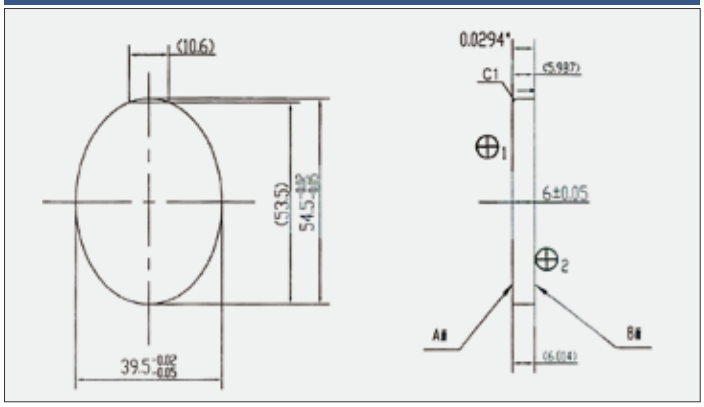
Coated surface flatness



Application case 2:

1. Precision requirement for wedge angle: <12″
2. 3.7um to 4.8um AR film is coated on⊕$_1$; the average transmissivity of surfaces A and B is 94%.
Beam splitting film is coated on⊕$_2$; reflection wave band from 0.43um to 1.6um, and transmission wave band from 3.7um to 4.8um; the average reflectivity of wavebands 0.4um to 0.9um, 1um to 1.6um, 1.064um and 1.57um is 94%.
3. The angle of incidence is 35 to 55 .
4. surface accuracy requirements: Surface A: RMS ≤1/20λ; PV≤1/4λ (reference); λ = 632.8nm, with power; Surface B: RMS ≤1/30 λ; PV≤1/5λ (reference); λ = 632.8nm, with power;
5. Undeclared chamfer C0.3
6. Operating temperature: -50℃~ 60℃

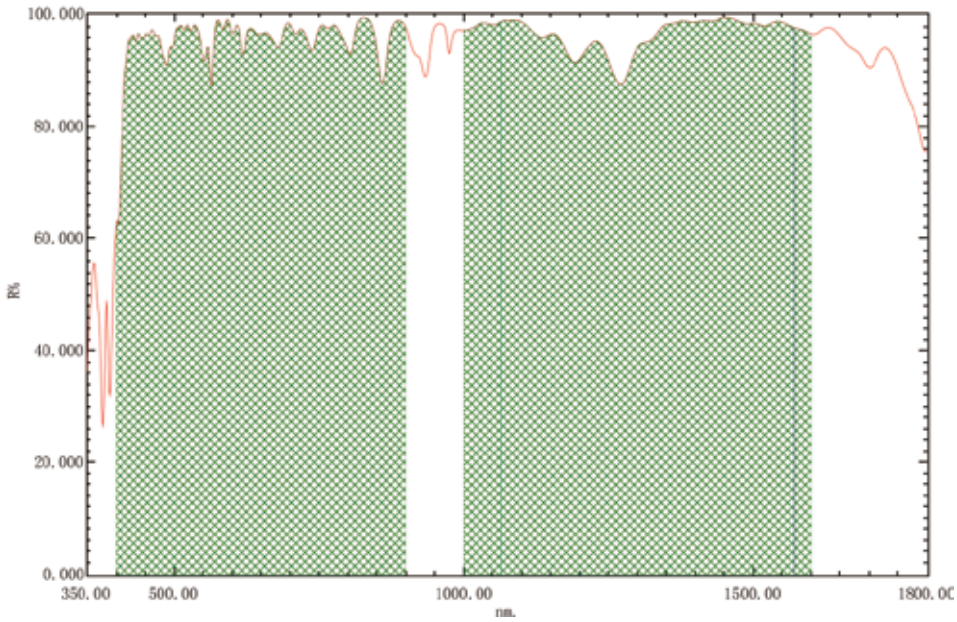
Product dimensions



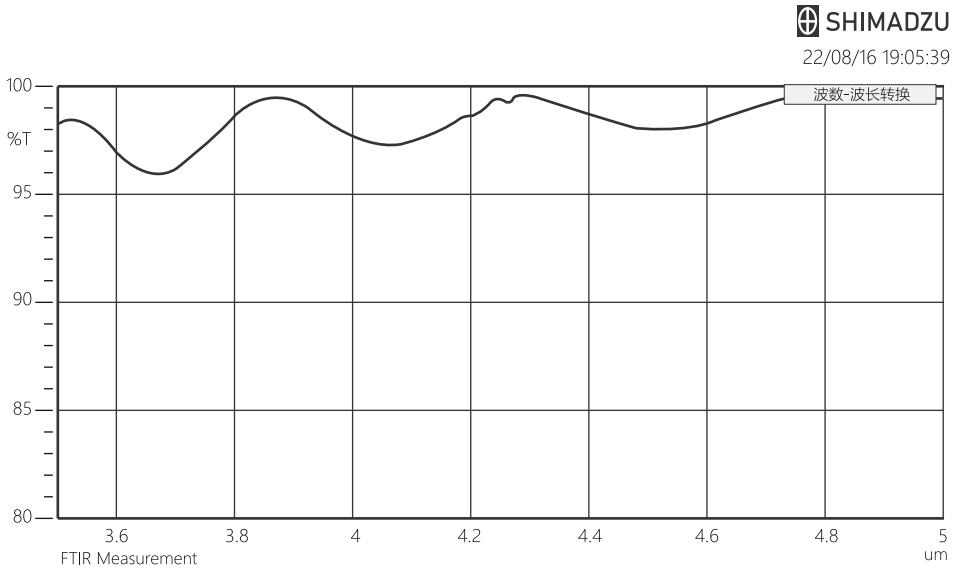
Element requirements

N	/
DN	/
DR	A
C1	/
C2	IV
B	/
D_{01}	47*36
D_{02}	/

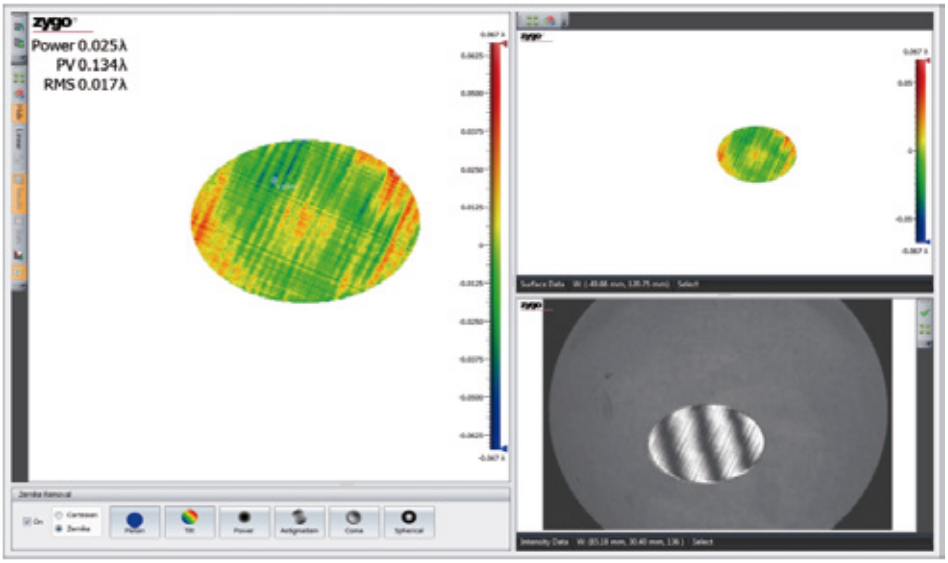
Spectral Peak Area Report

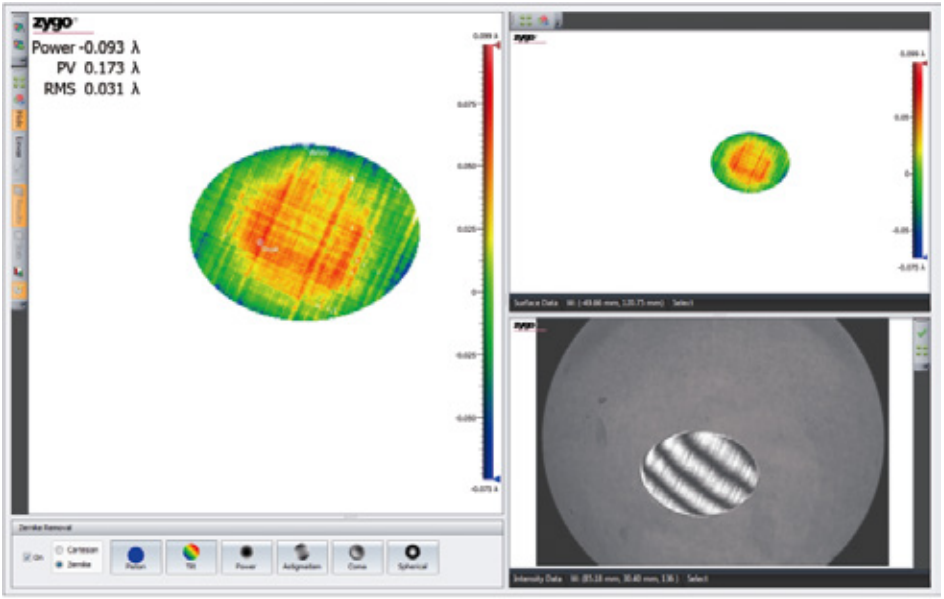


Zone	Color	Begin	End	Divisor	Area	Result	Description
1		400.00	900.00	500.000	47630.835	95.262	
2		1000.00	1600.00	600.000	57910.505	96.518	
3		1064.00	1065.00	1.000	98.579	98.579	
4		1570.00	1571.00	1.000	97.507	97.507	
5							



Coated surface flatness precision





Application case 3:

Technical requirements:

1. Operating wavelength: 522nm ~ 862nm

Anti-reflection coatings: Residual reflectivity: <0.5%; angle of incidence: 0±3°

Internal reflecting coatings: Rp>98%; Rs>98%; angle of incidence: 45±3°

Beam splitting coatings: Tp>95%, Rs>99.5%

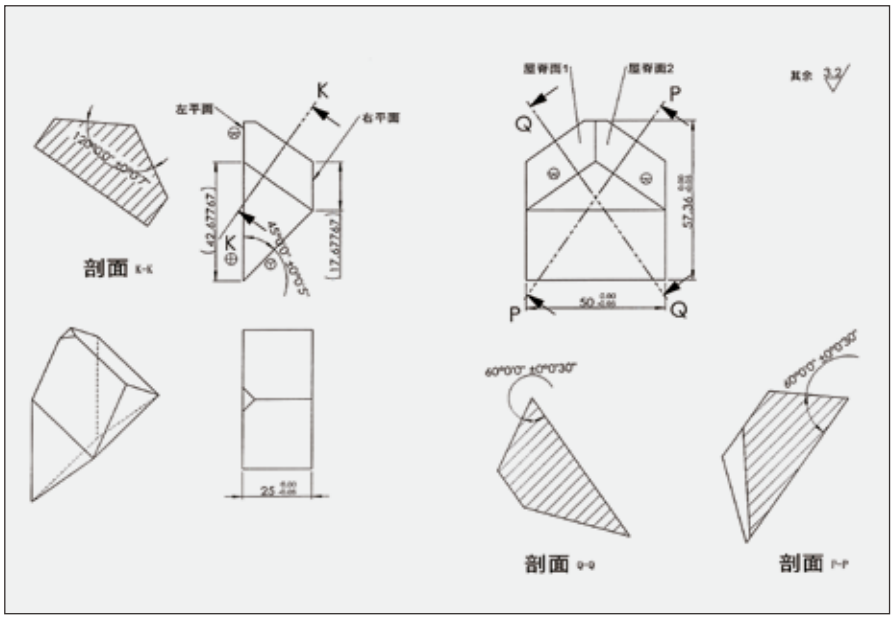
Extinction ratio: Tp/Ts>1000: 1; angle of incidence: 45±3°

2. Angle between the left plane and ridge plane 1: 60°±30″; angle between the left plane and ridge plane 2: 60°±30″

Angle between the right plane and ridge plane 1: 120°±30″; angle between the right plane and ridge plane 2: 120°±30″

Angle between ridge plane 1 and ridge plane 2: 120°±7″

Product dimensions

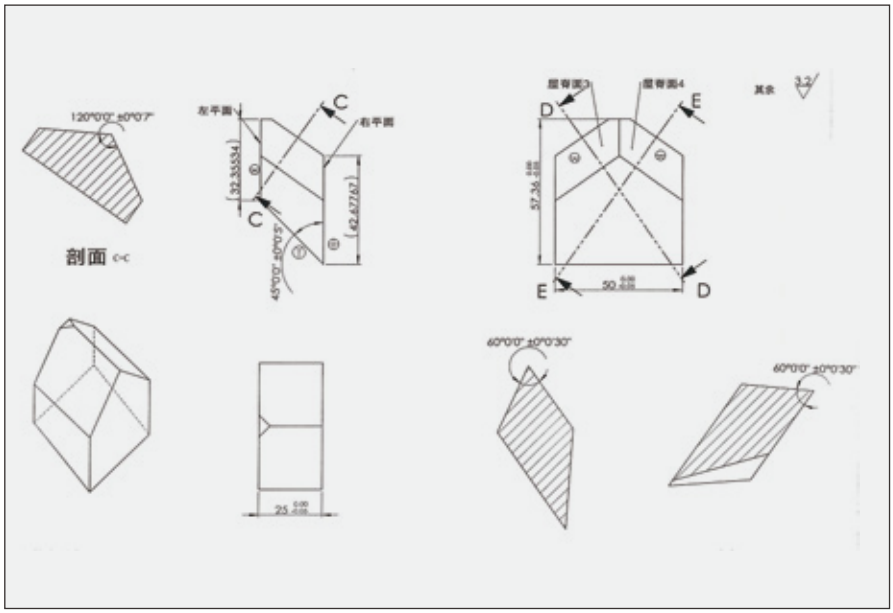


Material requirements	
ΔN_d	1B
ΔV_d	1C
Optical uniformity	3
Optical absorptivity	2
Stress birefringence	2
Fringe intensity	1C
Extent of bubble	1C

Element requirements	
N	0.5
ΔN	0.2
S/D	40/20
D_0	25*46

Materials	
Name	SF2
Nd	1.6477
Vd	32.848

Product dimensions

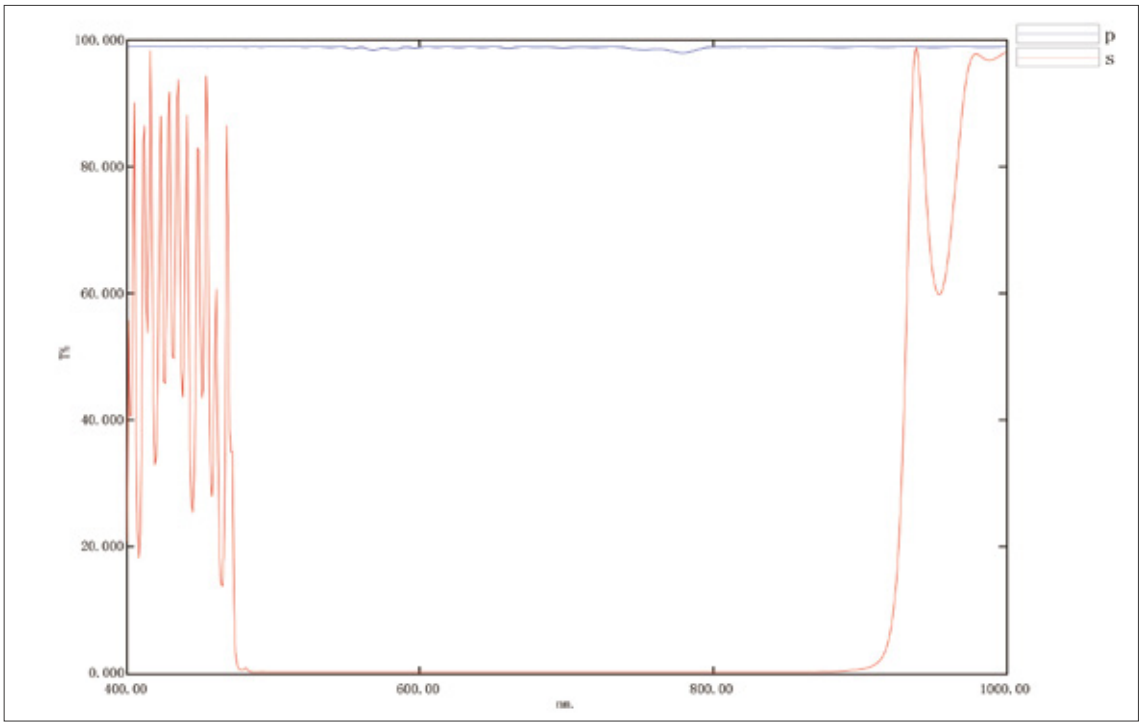


Material requirements	
ΔN_d	1B
ΔV_d	1C
Optical uniformity	3
Optical absorptivity	2
Stress birefringence	2
Fringe intensity	1C
Extent of bubble	1C

Element requirements	
N	0.5
ΔN	0.2
S/D	40/20
D_0	25*46

Materials	
Name	SF2
Nd	1.6477
Vd	32.848

Overlapping Spectrum Image Report



Application case 4:

Technical requirements:

1. Coating requirements: 1563.05nm

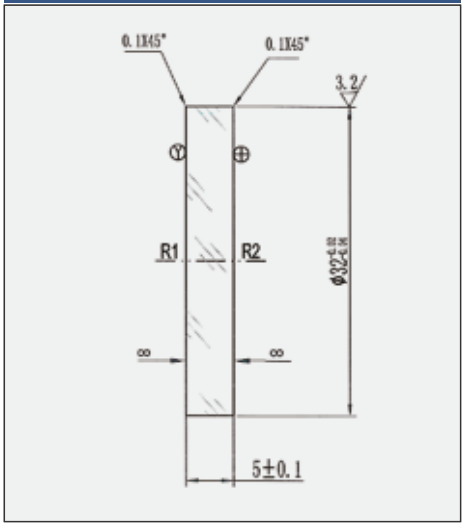
R >95%@1563.05nm ±0.1nm; 1540.56nm ± 0.1nm (beam splitting), 95%±1% (reflection)

5%±1% (transmission); beam splitting is realized through a single surface (R1), and surface R2 serves as the transmitting surface only.

2. surface accuracy requirement: Test with an interferometer (angle of incidence: 16。) and a test wavelength λ of 632.8nm. In the clear aperture range, beam splitting surface R1 (coated) has a surface accuracy RMS superior to λ/15 (including power) or λ/30 (excluding power) (power is superior to 0.5λ); the transmitted wave aberration (after coating) has an RMS superior to λ/30 (including power).

3. The parallelism is superior to 0.01mm.

Product dimensions



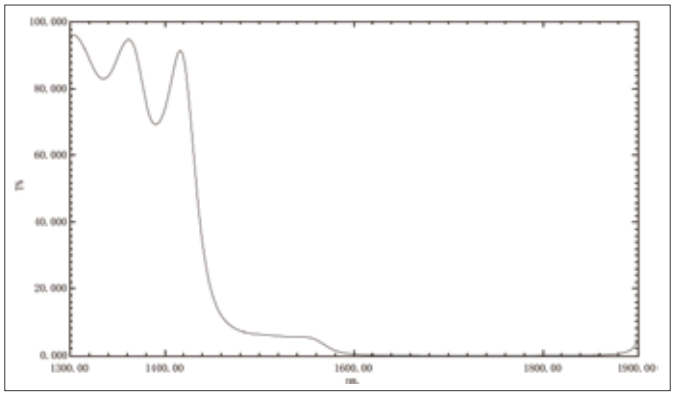
Quality of optical glass

ΔN_d	/
ΔV_d	/
Optical uniformity	H2
Optical absorptivity	1C
Stress birefringence	2
Fringe intensity	1C
Extent of bubble	3

Precision of optical machining

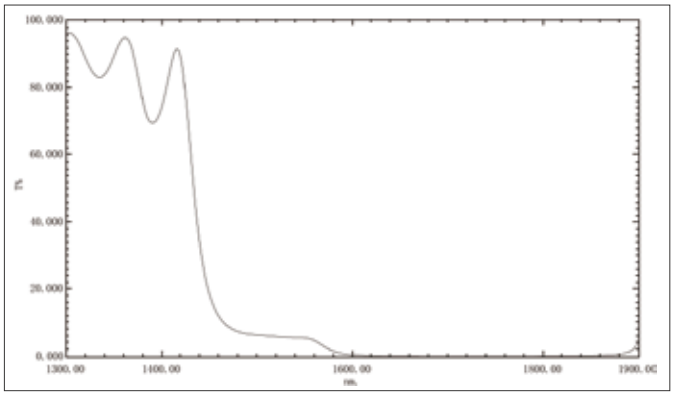
	R1	R1
Sample precision △R	A	A
Radius deviation N	/	/
Partial deviation △N	/	/
Eccentricity c	/	/
Surface finishment MIL	Ⅲ	Ⅲ
Clear aperture Do	Φ31	Φ31

Beam Splitter 2A Spectral Point Test Report



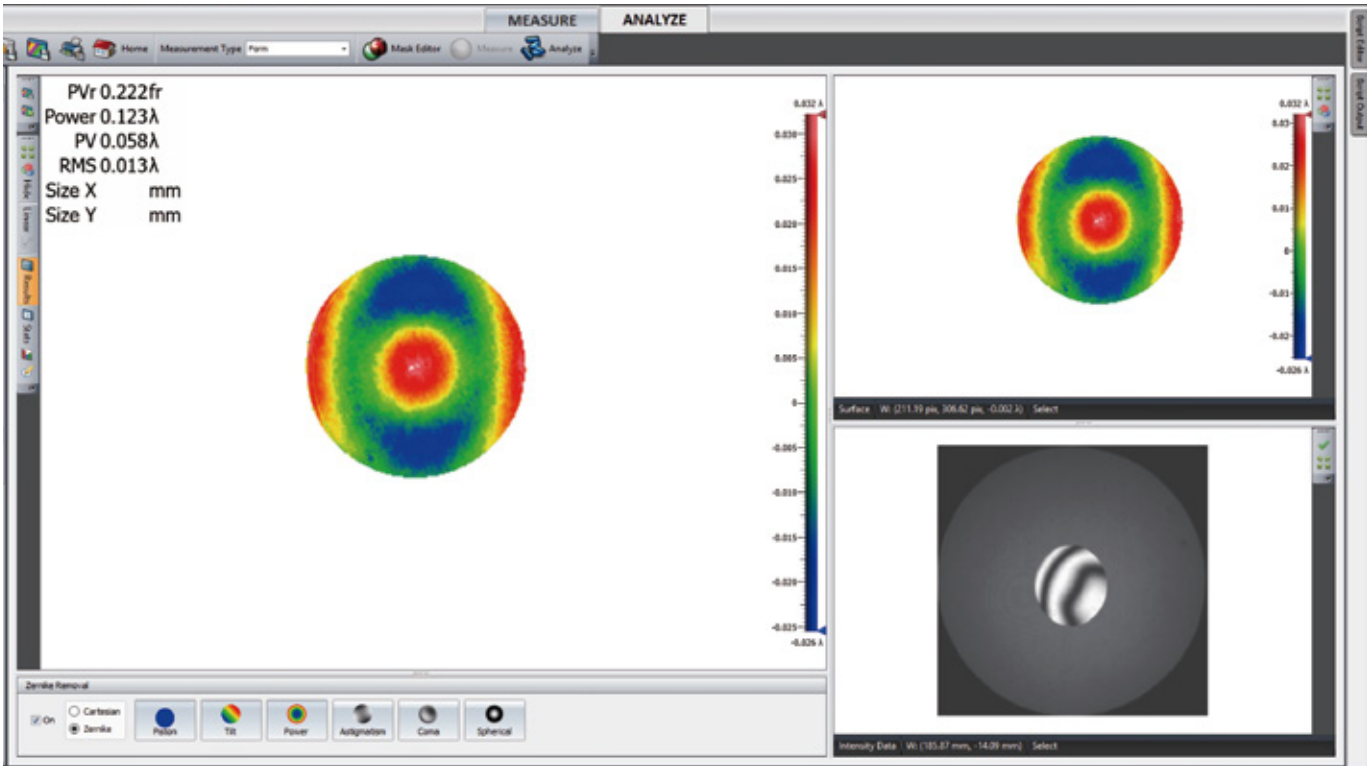
No.	Wavelength (nm)	Transmissivity
1	1540.00	5.545
2	1563.00	4.236

Beam Splitter 2A – S1 Spectral Point Test Report



No.	Wavelength (nm)	Transmissivity
1	1540.00	5.545
2	1563.00	4.236

Coated surface flatness precision



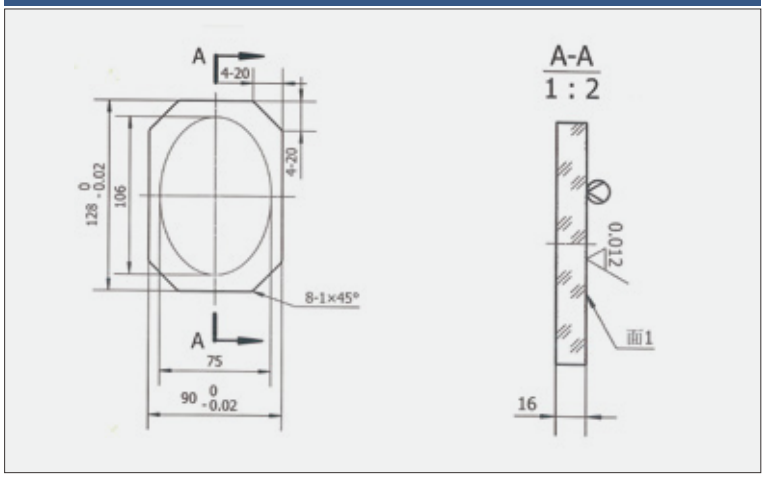
Reflecting coatings

Application case 1:

Technical requirements:

1. Surface accuracy requirements: After coating: RMS ≤ λ/40; Pvr ≤ λ/4 (λ = 632.8nm) (angle of incidence: 45°)
2. Chamfer: 0.6 x 45°
3. Reflection Coatings on surface 1; anti-damage threshold: >1.71J/cm2@8ns, 214MW/cm2; Rs≥99.8%, Rp≥99.8% (for the 1064nm wave band), or Rs≥95%, Rp≥95% (for the 532nm wave band)
(for the 532nm wave band) (angle of incidence: 45°)

Product dimensions



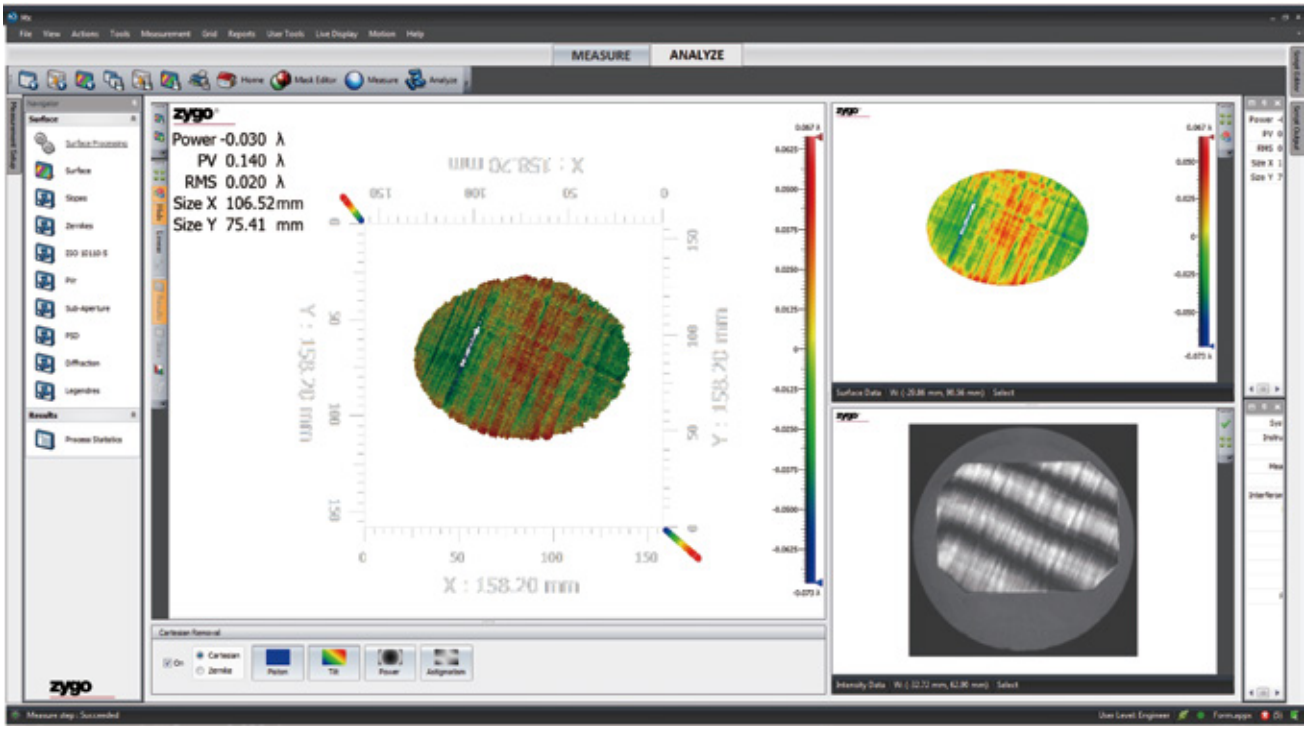
Material requirements

Optical uniformity	/
Birefringence	/
Fringe density	/
Extent of bubble	/

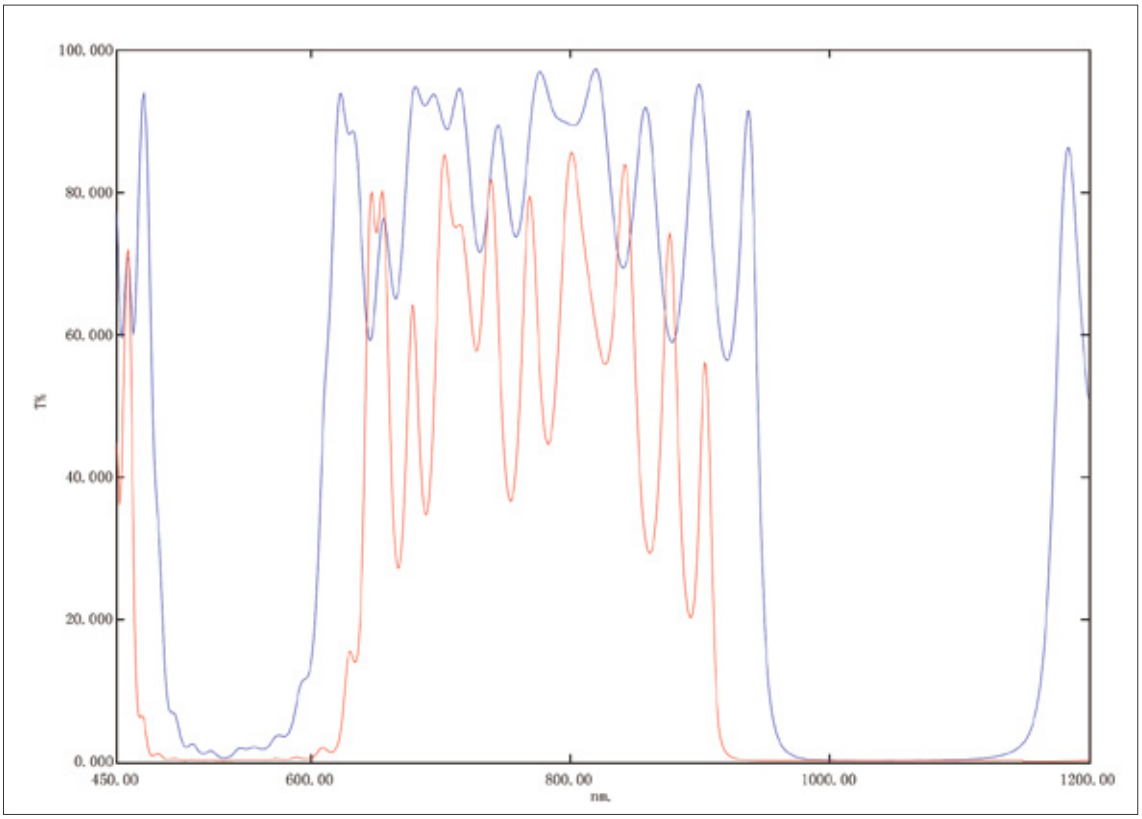
Product dimensions

P	Ⅲ
Φ1	106*75
Φ2	/

Coated surface flatness precision



verlapping Spectrum Image Report



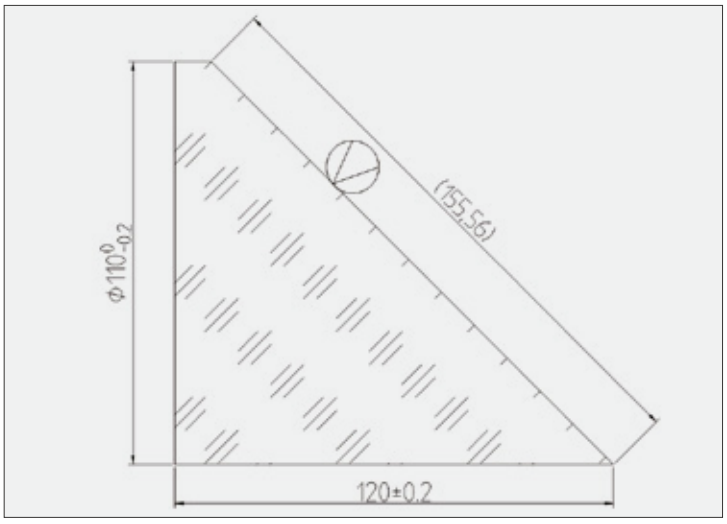
Application case 2:

Technical requirements:

1. Coating requirements: Fully reflecting dielectric coatings; angle of incidence: 45 °±1.5 °; reflectivity R (1080nm ± 30nm): >99.5%, or reflectivity R (486nm ~ 656nm): > 90%; optical element absorptivity: <0.01%

2. The coated reflecting surface has a surface accuracy superior to λ/6 (P -V) or λ/40 (RMS) (angle between the test beam and the mirror surface's normal: 45 °; test wavelength: 632.8nm; power density: 5000W/cm²)

Product dimensions



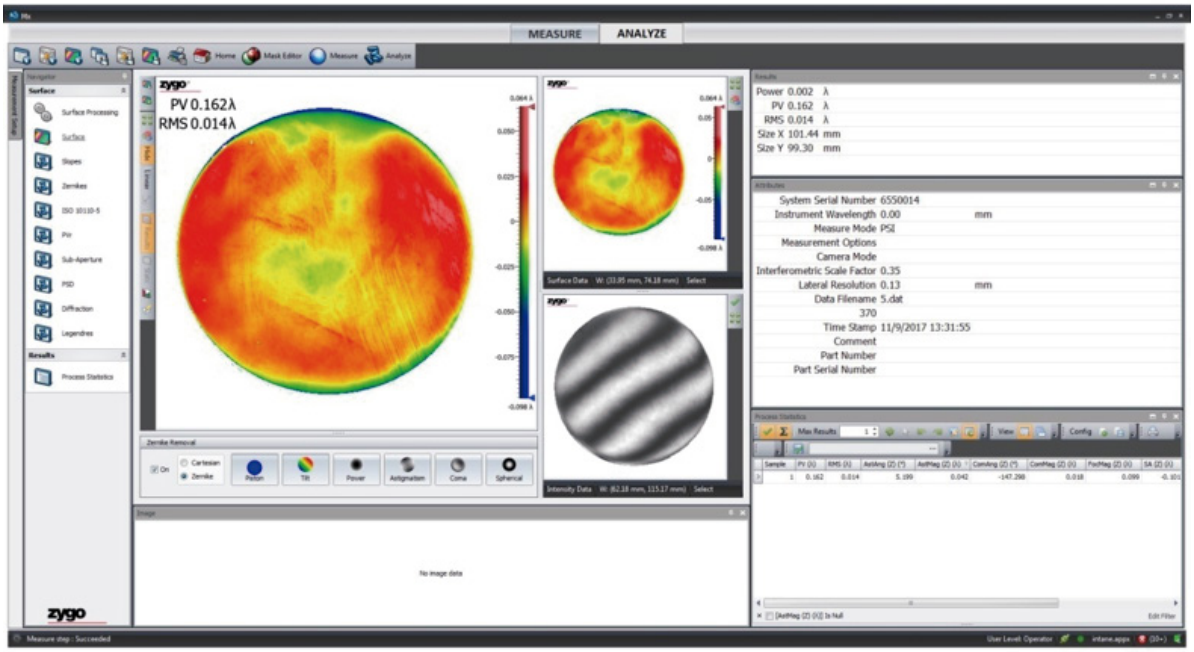
Material requirements

Optical uniformity	/
Birefringence	/
Fringe density	/
Extent of bubble	/

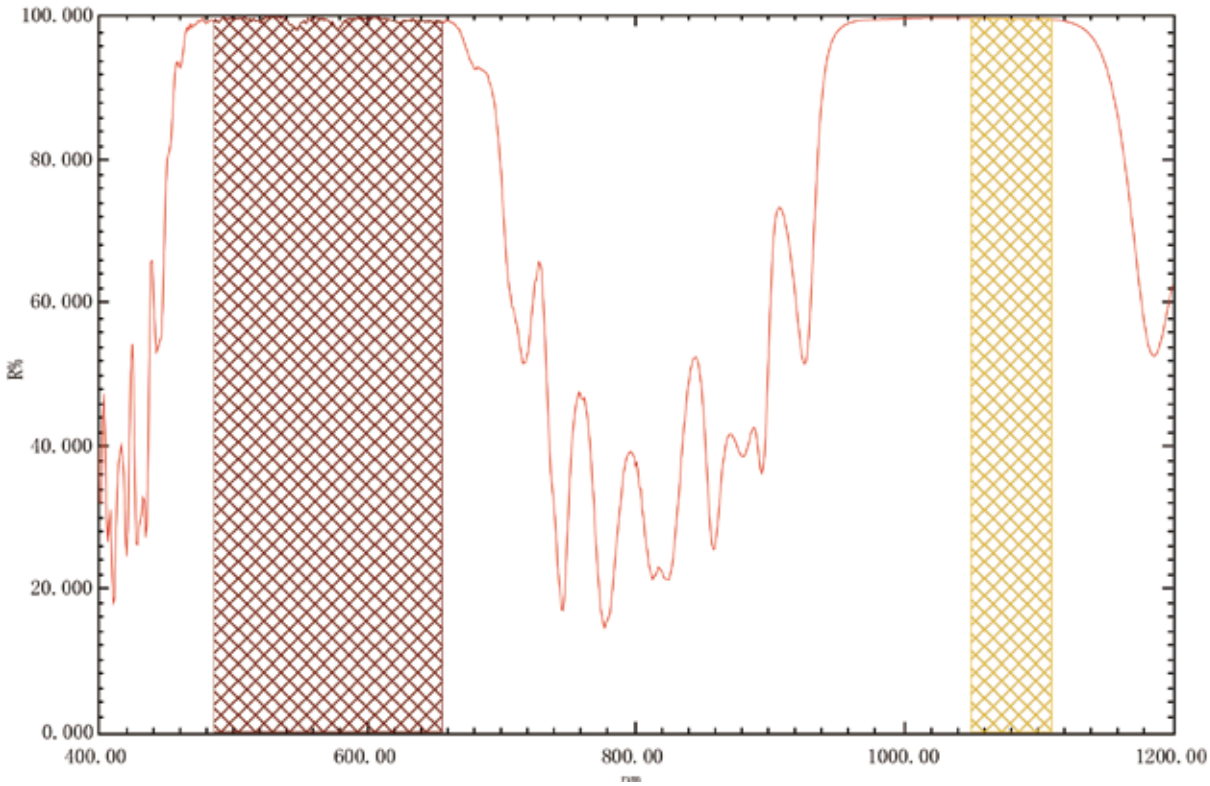
Product dimensions

P	Ⅲ
Φ1	106*75
Φ2	/

Coated surface flatness precision



Spectral Peak Area Report



Zone	Color	Begin	End	Divisor	Area	Result	Description
1		486.00	656.00	170.000	16893.831	99.375	
2		1050.00	1110.00	60.000	5975.694	99.595	
3							

Application case 3:

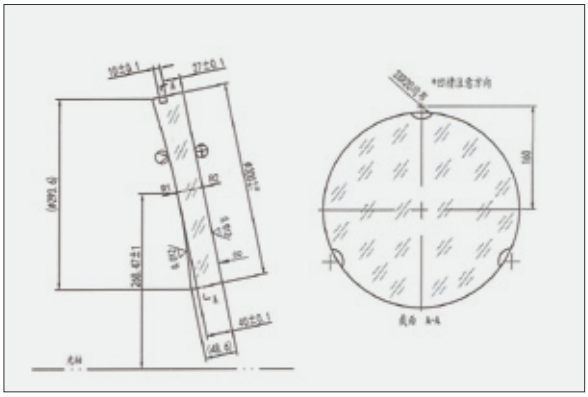
1. Surface R1 is an aspheric surface. The equation is: y2 = 2Rx – (1+k)x2. The radius of curvature of its top is: R = - 1281.12±1mm, K = -10.001, ady = 268.47 ±1mm

2. surface accuracy requirements: Testing is done with an interferometer. The uncoated surface accuracy is superior to λ/50RMS; PVQ is superior to λ/7; the coated surface accuracy is superior to λ/30RMS (λ = 632.8nm).

3. Coating requirements: Protective coatings over the reflecting dielectric coatings coated on surface R1; angle of incidence: 12°±8°; reflectivity >99.5% (operating wave band: 1050nm~1100mm), or reflectivity >98.5% (operating wave band: 500nm ~ 850mm); no damage after continuous impact with a maximum power density of 1000W/cm (@1050nm~1100nm)

4. Surface R2: Polished; anti-reflection coatings; operating wave band: 1050nm~1100nm.

Product dimensions



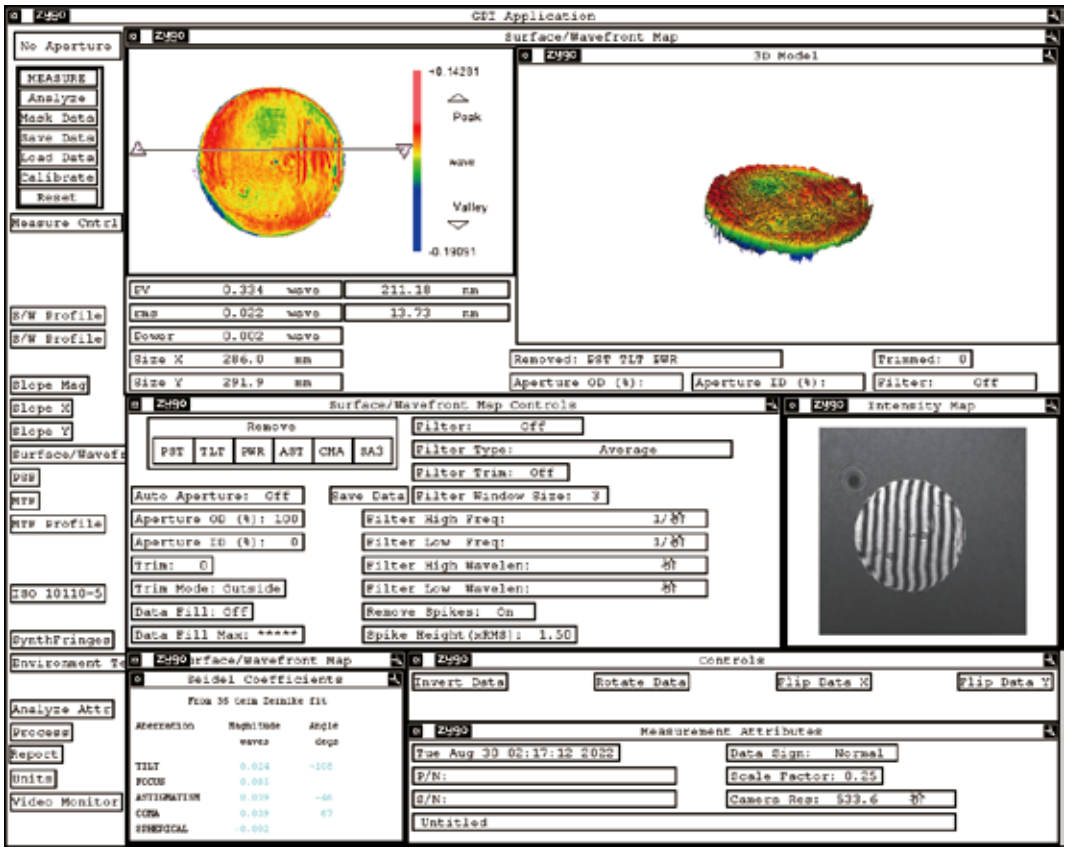
Product dimensions

N_d	/
V_d	/
Optical uniformity	/
Optical absorptivity	/
Stress birefringence	2
Fringe intensity	/
Extent of bubble	1C

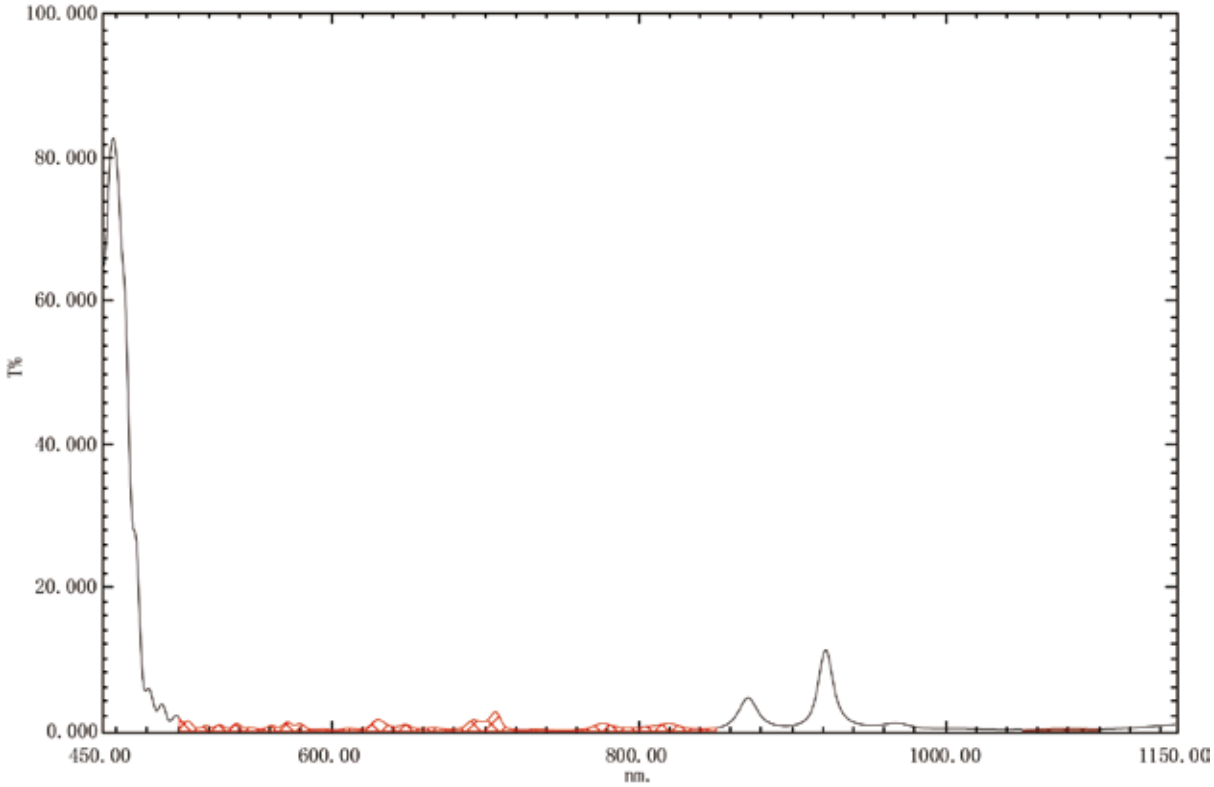
Product dimensions

	R1	R1
Specimen precision △R	/	/
Radius deviation N	/	/
Partial deviation △N	/	/
Eccentricity c	/	/
Surface finishment MIL	Ⅲ	Ⅲ
Clear aperture Do	Φ292	Φ292

Coated surface flatness precision



Spectral Peak Area Report



Zone	Color	Begin	End	Divisor	Area	Result	Description
1		500.00	850.00	350.000	218.036	0.623	
2		1050.00	1100.00	50.000	12.880	0.258	
3							

Filter coatings

Application case 1:

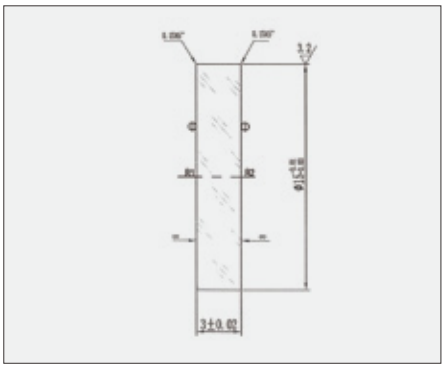
Technical requirements:

1. Coating requirements: 1560.05nm filter coatings; operating angle: 0°~2°
2. Pass band: center wavelength: 1563.05nm±2nm; FWHM ≤20NM; T >92% @ 1563.05nm ±1nm
3. Stop band: Within the stop band (400nm ~ 1800nm wave band, excluding the pass band): Tavg <0.2%; T <0.01%@1540.56nm ± 1nm (0D4)
4. surface accuracy requirements: Testing is done with an interferometer; λ = 632.8nm.

Uncoated condition: Transmitted wave aberration (including power): superior to 1/60 λRMS; two surface accuracy (including power): superior to 3λPV

Coated condition: Transmitted wave aberration (including power): superior to 1/40 λRMS (testing can be done with a wavefront sensor. In the case of a subaperture of Φ8.8mm: RMS: superior to λ/97; λ=1563nm; 4 apertures at least); parallelism: superior to 0.01mm.

Product dimensions



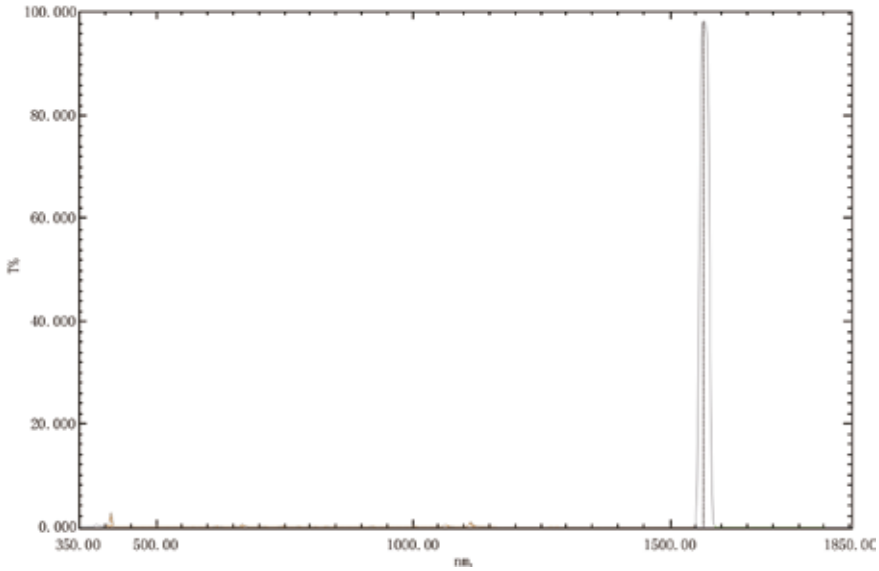
Product dimensions

N_d	/
V_d	/
Optical uniformity	H2
Optical absorptivity	1C
Stress birefringence	2
Fringe intensity	1C
Extent of bubble	3

Product dimensions

	R1	R1
Specimen precision △R	A	A
Radius deviation N	/	/
Partial deviation △N	/	/
Eccentricity c	/	/
Surface finishment MIL	Ⅲ	Ⅲ
Clear aperture Do	Φ14.1	Φ14.1

Spectral Peak Area Report



Zone	Color	Begin	End	Divisor	Area	Result	Description
1		400.00	1545.00	1145.000	75.689	0.066	
2		1585.00	1800.00	215.000	0.711	0.003	
3		1540.00	1541.00	1.000	0.008	0.008	
4		1563.00	1564.00	1.000	98.135	98.135	
5							

Application case 1:

Technical requirements:

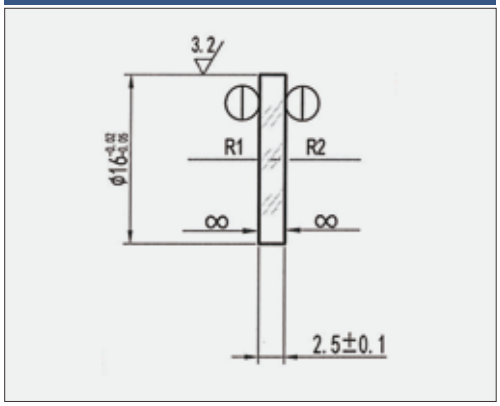
1. surface accuracy requirements: Coated transmitted wave aberration (including power): superior to λ/40RMS (λ = 632.8nm)
2. Coating requirements: Filter coatings coating on surfaces R1 and R2; operating angle: ±3°; overall filter indexes:

Pass band: center wavelength: 830nm; bandwidth: <5nm; T: >90%830nm

Stop band: 0D3 (in the 350nm ~ 1000nm wave band, excluding the pass band)

3. Parallelism: 0.01mm
4. The trim has protective chamfers.

Product dimensions



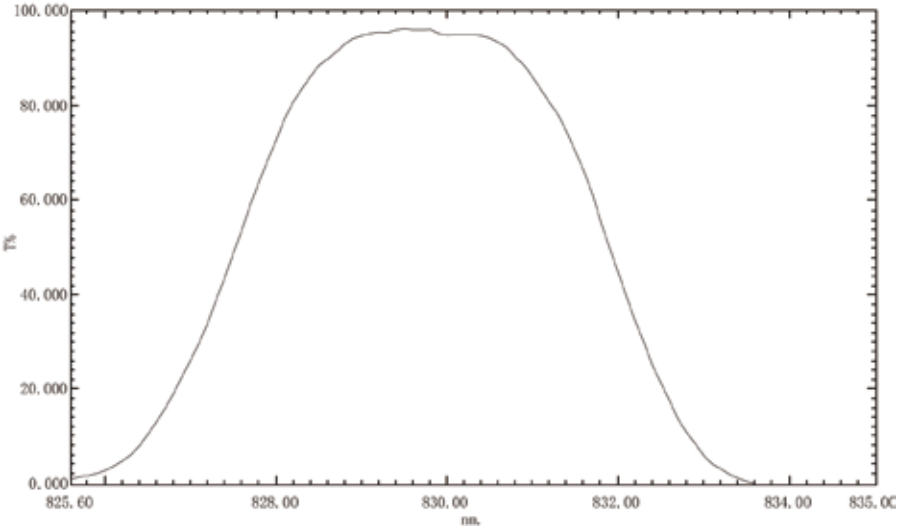
Product dimensions

N_d	/
V_d	/
光学均匀性	H2
光吸收系数	1C
应力双折射	2
条纹度	1C
气泡度	3

Product dimensions

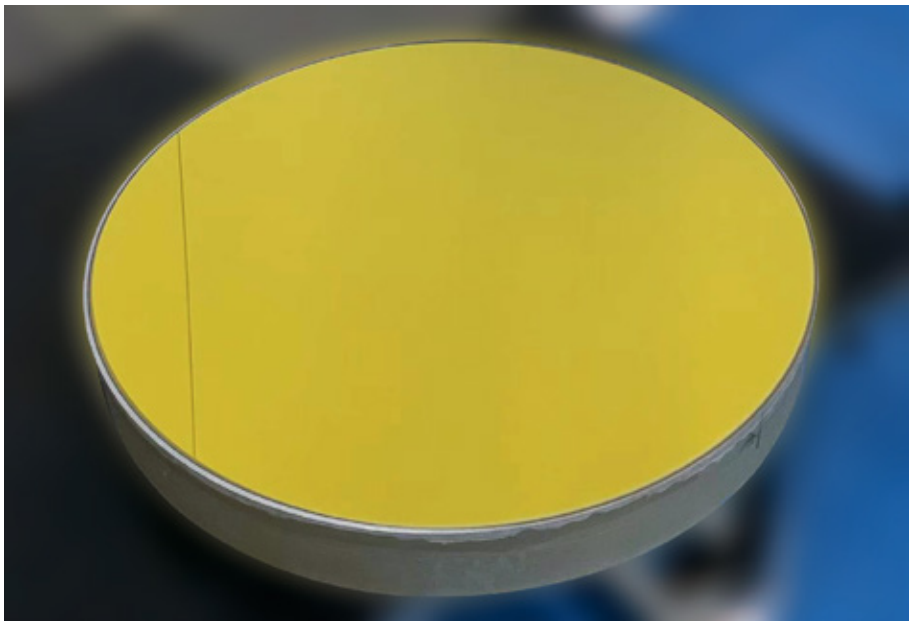
	R1	R1
样板精度ΔR	A	A
半径偏差N	/	/
局部偏差ΔN	/	/
偏心c	/	/
表面光洁度MIL	Ⅲ	Ⅲ
通光孔径Do	Φ15	Φ15

Spectral Peak Area Report

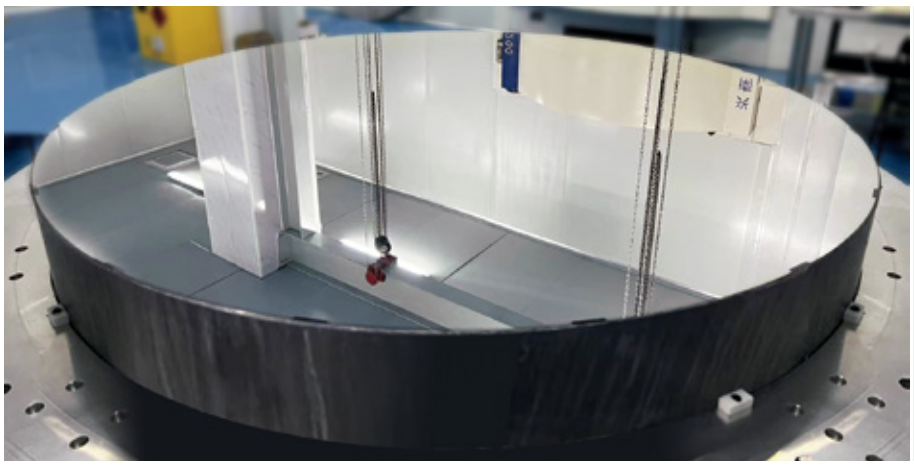


No.	Wavelength (nm)	Transmissivity
1	830.00	94.805
2	827.50	48.787
3	832.00	44.560

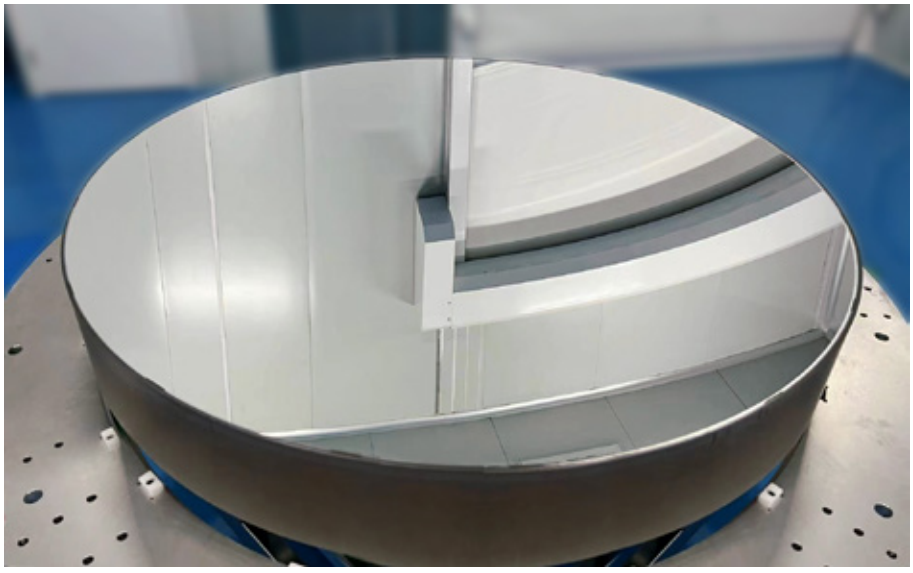
Metal film



◀ Gold coated



◀ Silver coated



◀ Aluminum coated

Application case of high surface accuracy high-reflecting coatings of large-aperture high-power laser damage threshold

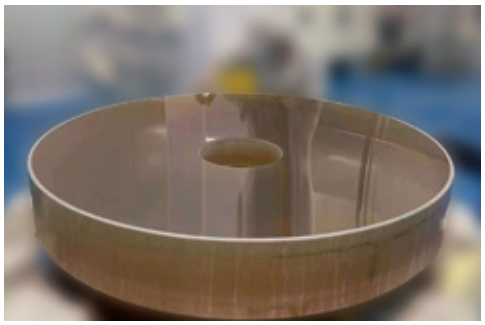
Technical requirements:

1. Aperture: D1230
2. Coating: Reflecting dielectric coatings; wave band: 420nm ~ 800nm; average reflectivity: ≥97%
3. Eccentricity between the primary mirror's optical axis and the excircle: ≤0.5mm
4. Uncoated mirror surface: PVr ≤λ/4; RMS ≤λ/40 (λ = 632.8nm)
5. Coated mirror surface: PVr ≤λ/3; RMS ≤λ/30 (λ = 632.8nm)
6. Error of radius of curvature at top: ≤1mm
7. Perpendicularity between the optical axis and back face A: 0.05mm

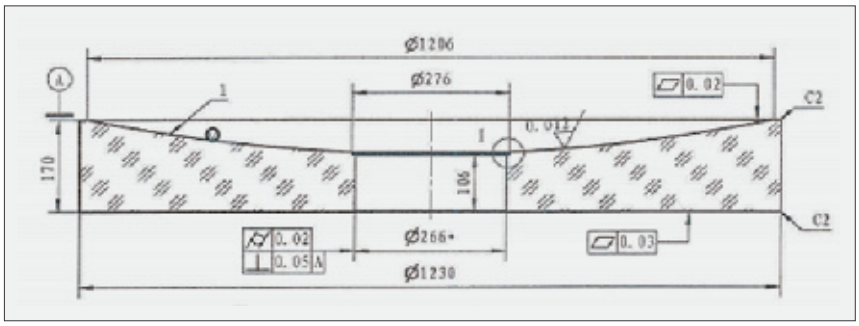
Precision of Optical Machining

Optical machining precision	≤0.5mm
Size	Φ266
Error of radius of curvature at top	≤1mm
Perpendicularity between the optical axis and end face A	0.05mm
Roughness of reflecting surface	≤2nm
Uncoated mirror surface flatness	PVr≤λ/4, RMS≤1/40 (λ=632.8nm)

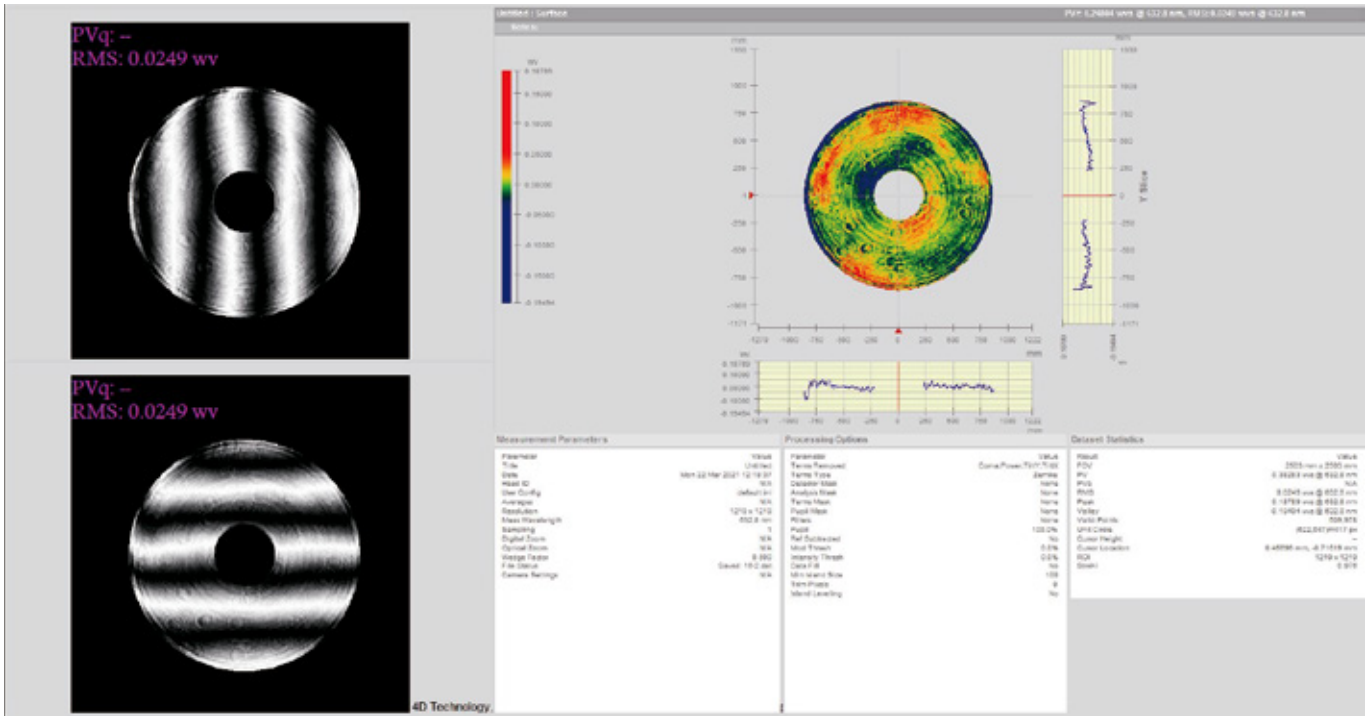
Physical uncoated mirror

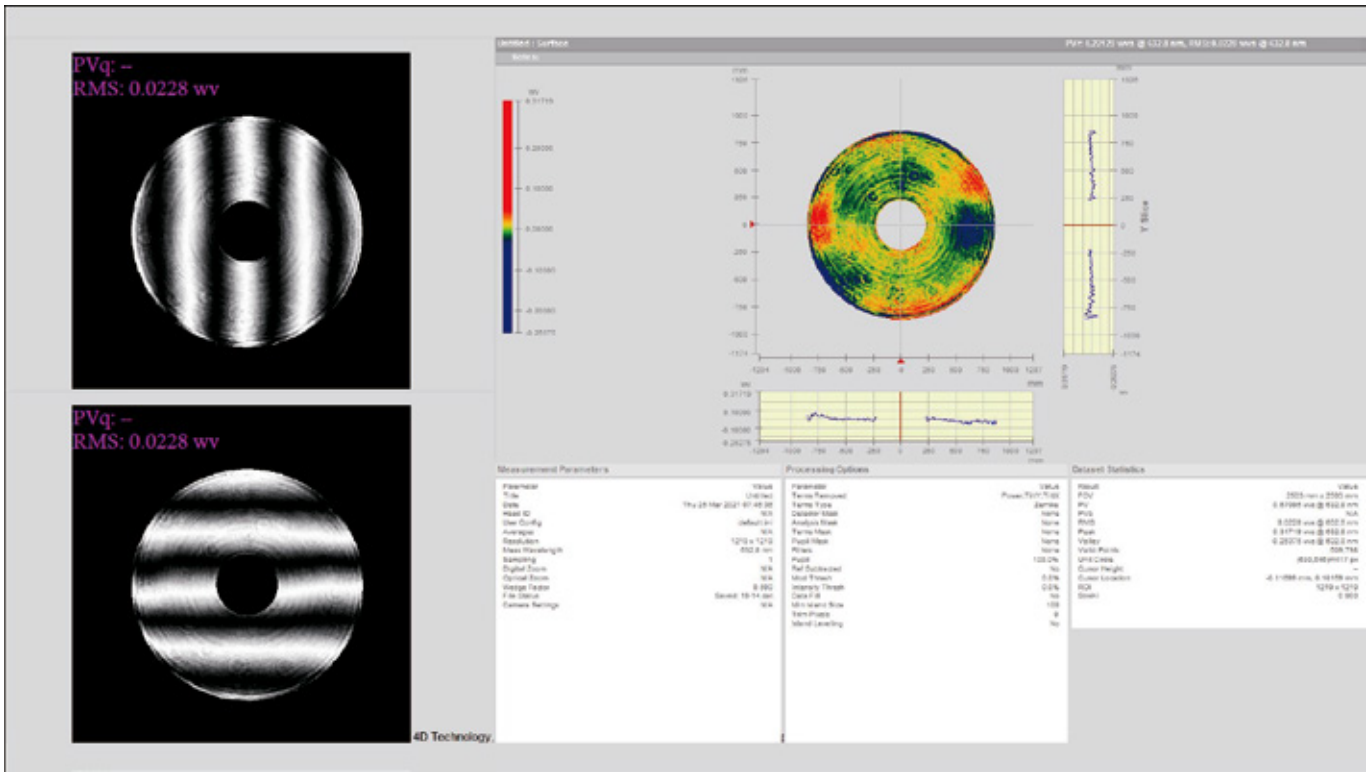


Product dimensions



Result of uncoated surface flatness test



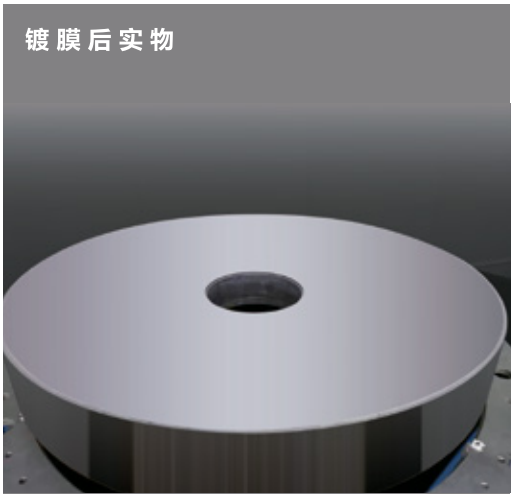


Result of the surface flatness test in the 0° direction in a Φ1200mm aperture range before coating of the large-field primary mirror.

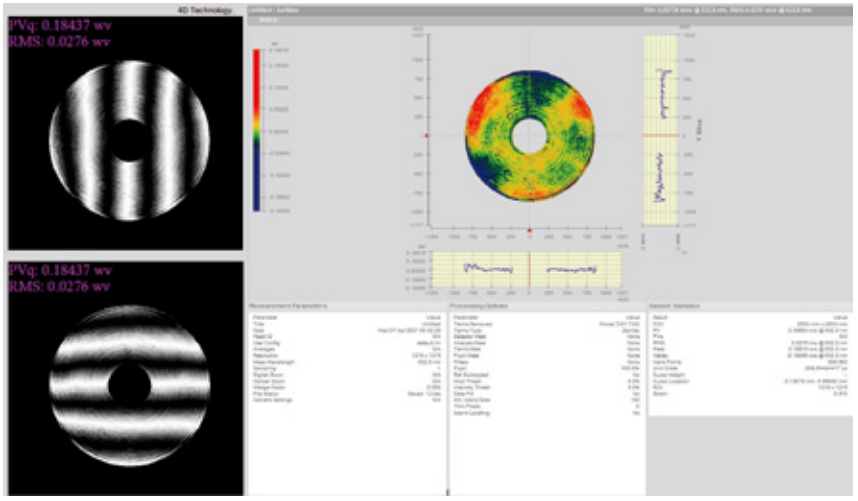
Technical difficulties:

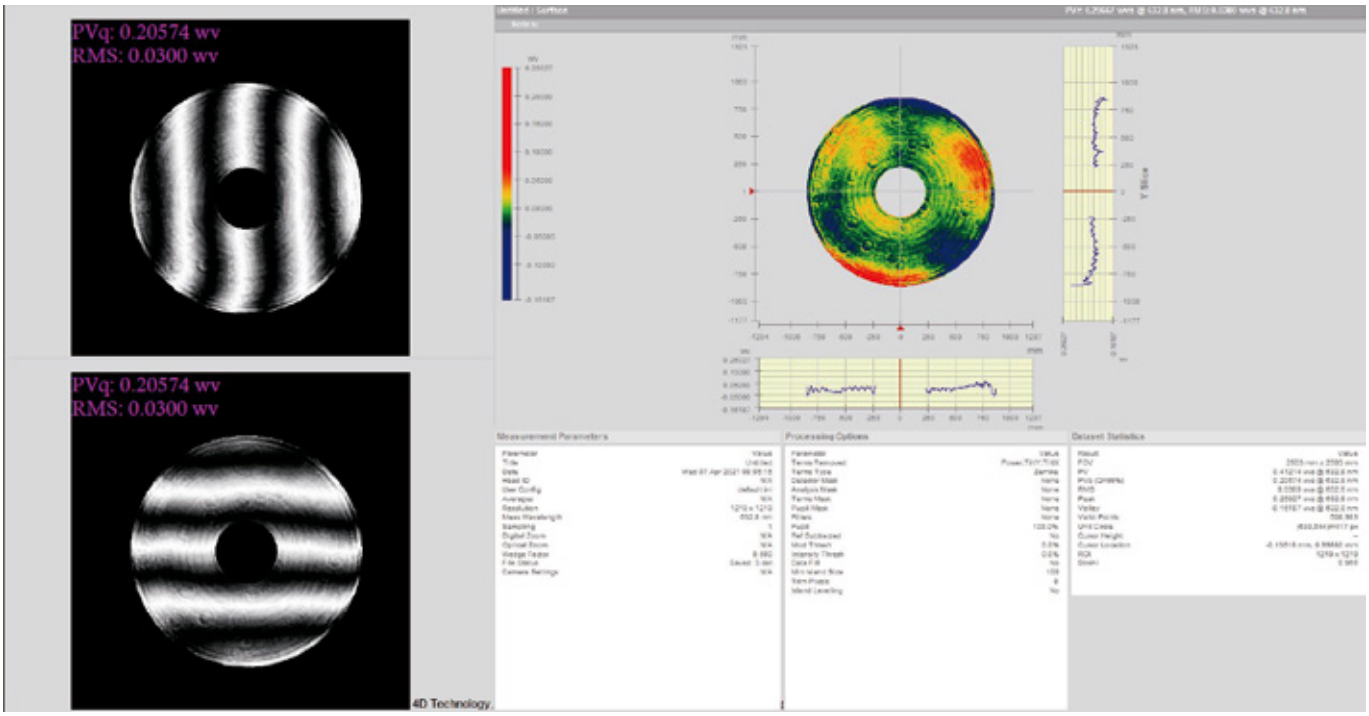
1. Coating requirements: Reflecting dielectric coatings; wave band: 420nm ~ 800nm; average reflectivity: ≥97% (angle of incidence: <15°) (The thick coatings results in some difficulties.)
2. Due to the large product size, the coatings uniformity is difficult to control.
3. Coated surface accuracy: PVr ≤λ/3; RMS ≤λ/30 (λ = 632.8nm)

Physical mirrors before and after coating

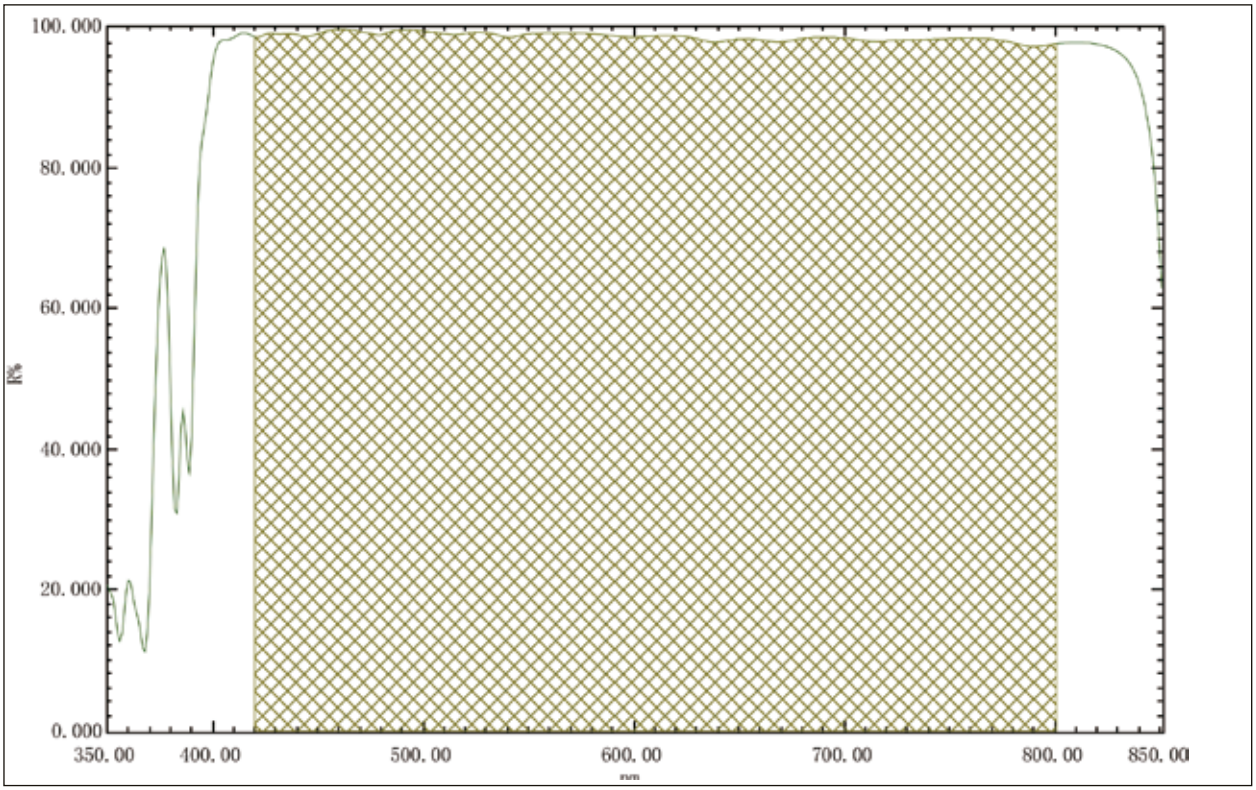


Result of surface flatness test after coating





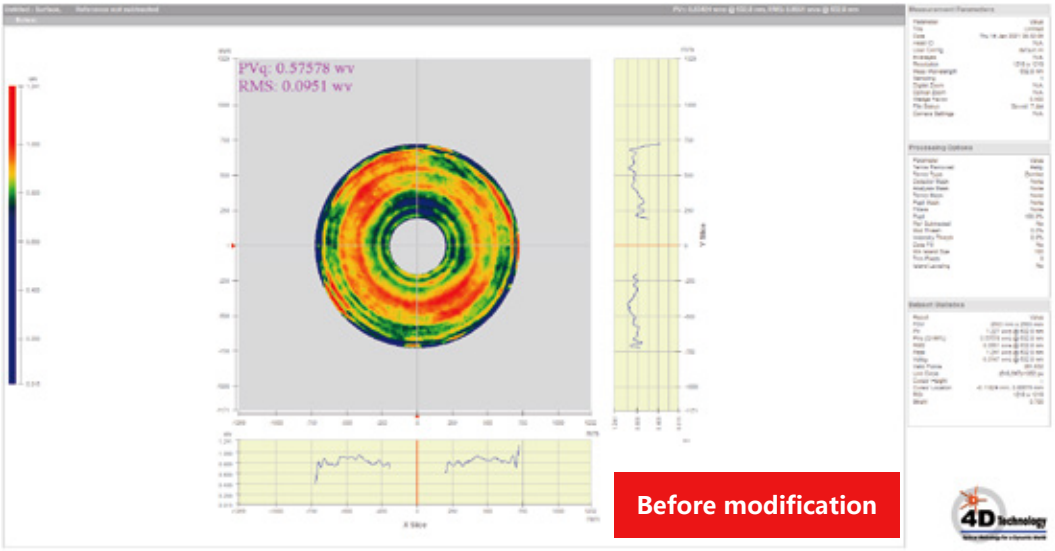
Spectral Peak Area Report



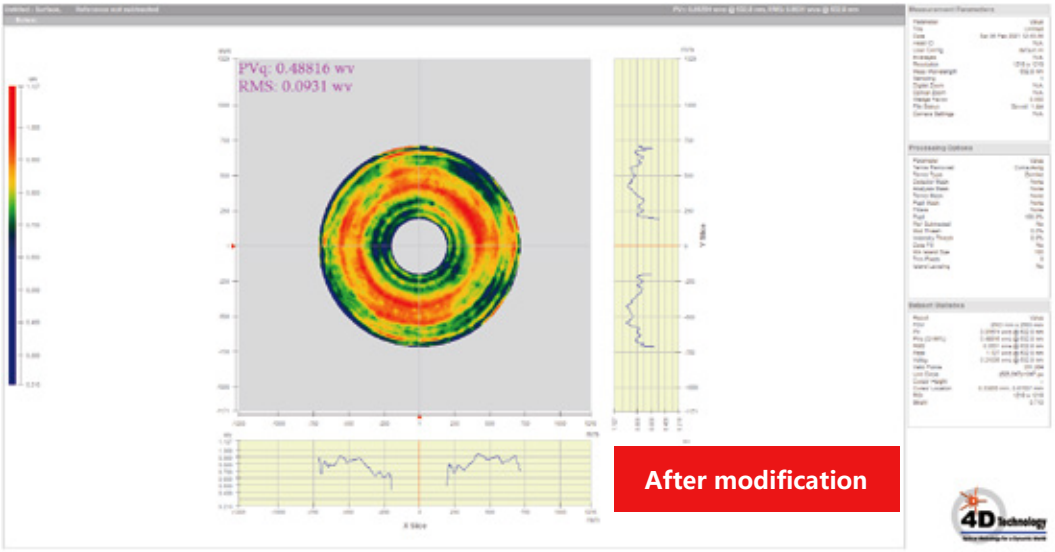
Zone	Color	Begin	End	Divisor	Area	Result	Description
1		420.00	800.00	380.000	37443.539	98.536	
2							

Large-aperture SiC modification

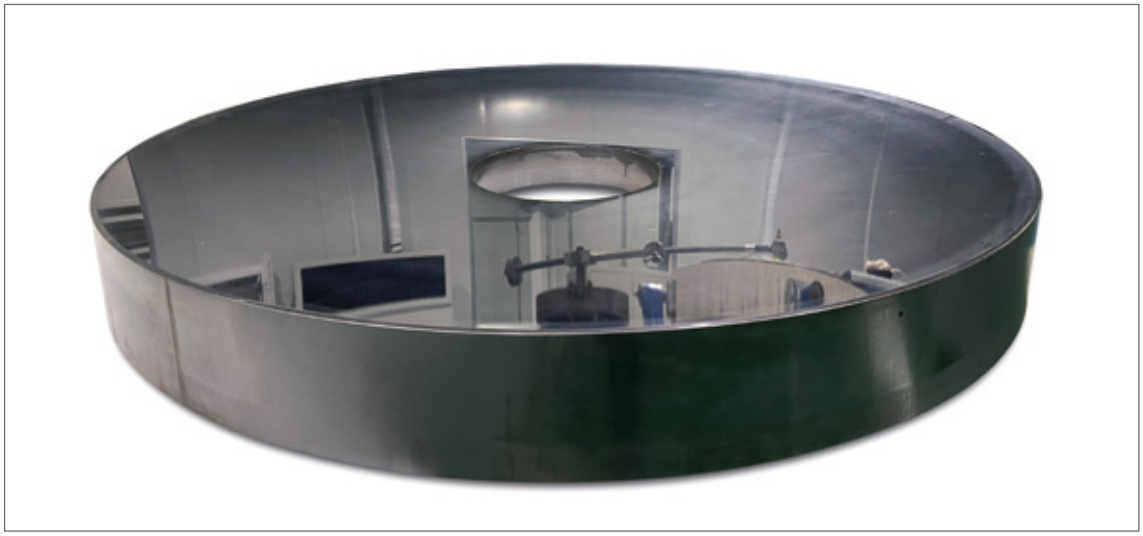
Result of surface flatness test of unmodified SiC primary mirror



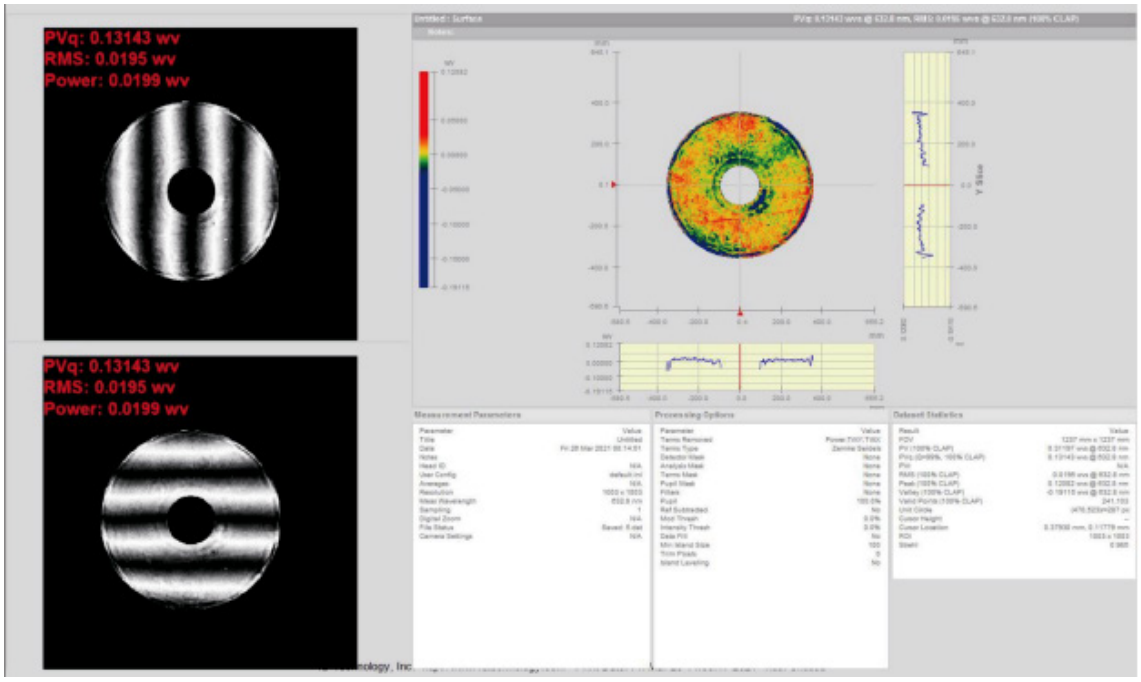
Result of surface flatness test of modified SiC primary mirror



Physical modified SiC primary mirror after finishing polish



Result of surface flatness test of modified SiC primary mirror after finishing polish

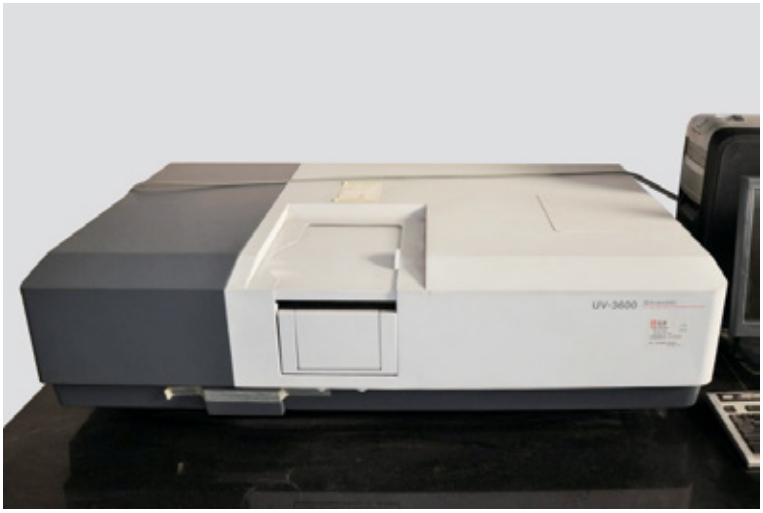


After modification

In possession of advanced R&D and production capacity in the optical coating field, and the largest D2200mm coating equipment, Intane can realize D1800 coating for optical elements and can machine high-precision optical elements with such special requirements for their surfaces as antireflection coatings, beam splitting coatings and filter coatings. The R&D team of Intane provides customers with better optical coating solutions by means of continuous innovation.

◀ Cary 7000 Spectral detector

The Cary7000 all-purpose spectrophotometer can measure samples of almost all types in the terms of their angles, reflectivity and trans-missivity. The measurement modes include transmission, absolute reflection, absorption, and scattering.

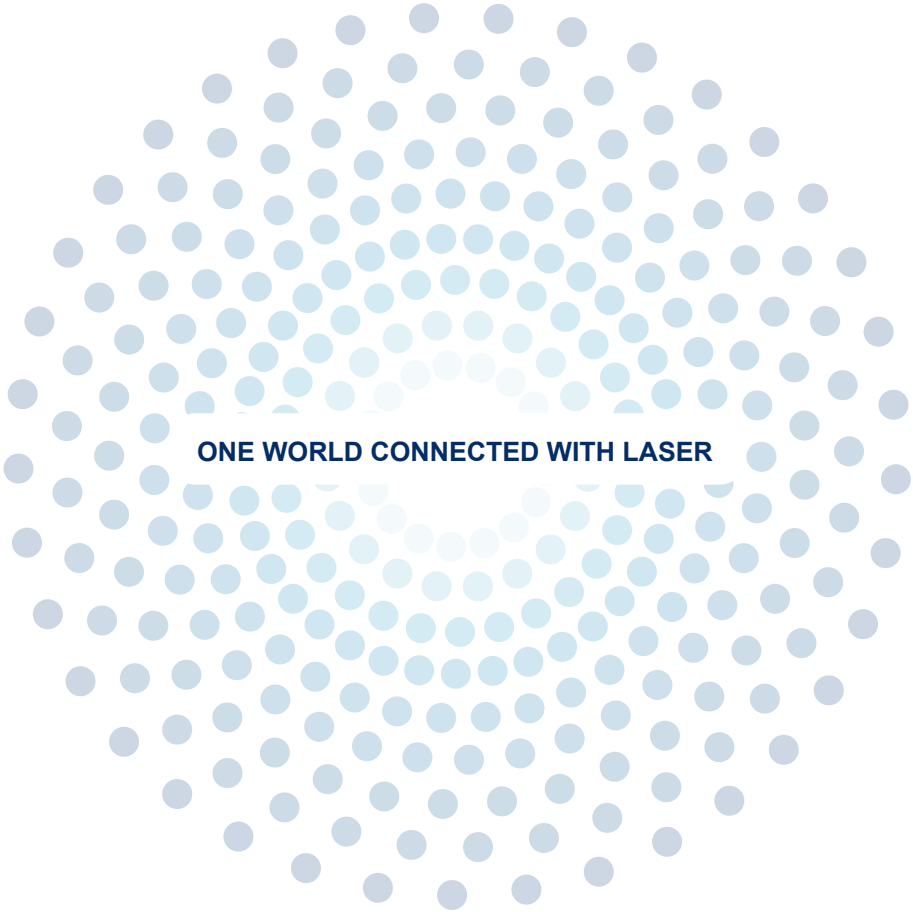


◀ UV3600 spectrophotometer

The UV3600 spectrophotometer is a new supplementary model among high-end UV-VIS-NIR spectrophotometers. It has high sensitivity, high resolution and abundant accessories suitable for different applications.

▼ UV3600 spectrophotometer

▼ Salt spray test equipment



Brochure series:

Ultra-precision Optical Elements
Precision Optical Lens Assembly
Large-size Precision Optical Elements
Precision Optical Coating Solution
Collimators
Satellite Laser Communication System Solution

Intane OPTICS® 英田光学
ONE WORLD CONNECTED WITH LASER
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Sample No.: YT010 2025 • I

Intane OPTICS® 英田光学

Precision Optical Lens Assembly

Company profile

Intane Optics: Precision Optical Solutions

Founded in 2003 by Professor Zhou Bifang, former Director of the Nanjing Astronomical Instruments Research Center, Intane Optics is a national leader in optical precision. Specializing in Optical and Mechanical Systems, Electro-Optical Systems, and related products, we provide comprehensive optical solutions from design to delivery.

From Components to Complete Solutions

Intane Optics has grown from a component supplier to a full-spectrum solutions provider. We offer a wide range of services including optical fabrication, quality assurance, and custom optical design. Our extensive network and advanced capabilities enable us to handle projects, ensuring precision and performance at every stage—from prototyping to full-scale production.

Custom Optical Solutions

Our dedicated team collaborates closely with clients to deliver custom optics tailored to specific needs. We manage the entire process—design, fabrication, coating, assembly, testing and on site service—ensuring top-tier quality and reliability for each product.

Innovation, Quality, and Customer Satisfaction

We are committed to innovation and quality, continually refining our technology to meet the evolving demands of industries like aerospace, communications, defense, manufacturing and EO testing. With over two decades of experience, Intane Optics delivers reliable, high-performance optical systems that support our clients' success.

Why Choose Intane Optics?

With unmatched expertise and cutting-edge equipment, Intane Optics is your trusted partner for custom optical components and integrated systems. Explore how our solutions can enhance your projects with precision, reliability, and excellence.

Contents

ONE WORLD CONNECTED
WITH LASER

Industrial Lens

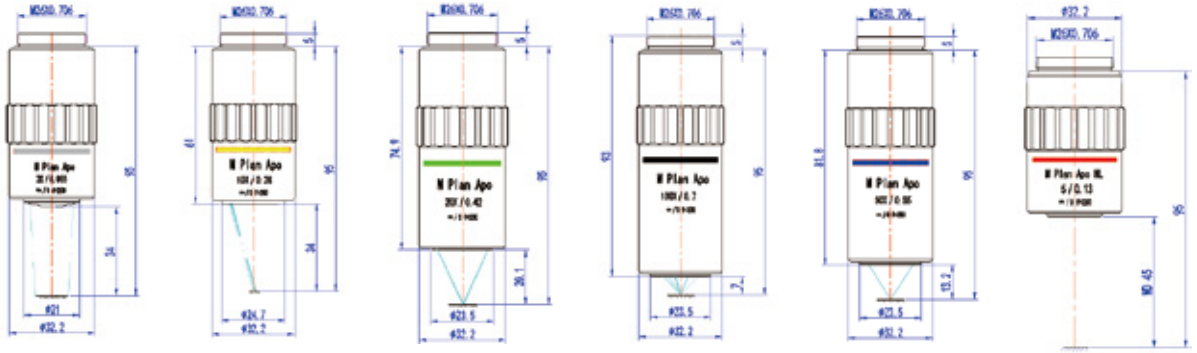
Dimensions: (Unit:mm)

Industrial APO Microscope Lens

Intane's M-Plan Apo industrial apochromatic objectives are designed for bright field applications, offering an optimal balance between long working distance and ultra-high numerical aperture. These objectives provide exceptional cost-efficiency without compromising on performance.

Key Features:

- Infinity-corrected design for enhanced optical performance.
- Plan-apochromat objectives with superior chromatic aberration correction, ensuring exceptional color fidelity.
- Outstanding resolution and ultra-high numerical aperture for superior clarity in both observation and photomicrography, delivering optimal color purity, contrast, and image flatness.
- High resolution with minimal distortion, ensuring precise and accurate imaging.
- Cost-effective performance with excellent optical quality, offering great value for demanding industrial applications.
- Dedicated bright field application, ideal for high-quality imaging in visible light.



Technical parameters:

Product Name (Magnification)	Numerical aperture NA	Working distance WD (mm)	Focal length f(mm)	Resolution R(μm)	Depth of field ±D.F. (μm)	Object field of view (mm)
M Plan Apo 2X	0.06	34	100	5	91	Φ12
M Plan Apo 5X	0.13	45	40	2	14	Φ4.8
M Plan Apo 10X	0.28	34	20	1	3.5	Φ2.4
M Plan Apo 20X	0.42	20.1	10	0.7	1.6	Φ1.2
M Plan Apo 50X	0.55	13.2	4	0.5	0.9	Φ0.48
M Plan Apo 100X	0.7	7	2	0.4	0.6	Φ0.24

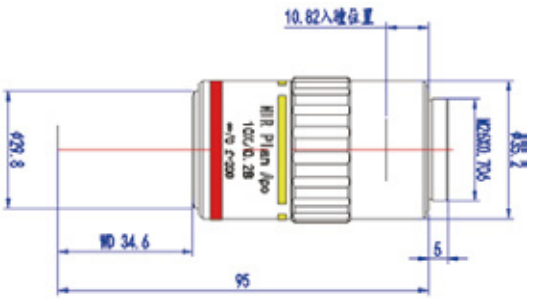
NIR Achromatic Objective

Intane's NIR Achromatic objectives are infinity-corrected, long working distance microscope objectives, specifically designed for applications across the visible to near-infrared spectrum, with an operating wavelength range of 400-1100 nm. Featuring a flat-field apochromatic design, these lenses are ideal for semiconductor inspection, silicon film analysis, and various other high-precision fields.

Key Features:

- Infinity-corrected design for consistent performance across a wide range of wavelengths.
- Long working distance for enhanced flexibility in industrial applications.
- Plan-field achromat design for superior image flatness and sharpness.
- Wide wavelength coverage, from the visible spectrum (commonly observed wavelengths) to the near-infrared region (~1800 nm), ensuring optimal performance across multiple bands.
- Improved resolution—approximately 50% higher than standard objectives—providing more precise imaging.
- Ideal for bright field observation as well as laser processing applications.
- High damage threshold coating (12 J/cm², 10 Hz, 10 ns, 1064 nm), making it suitable for high-intensity laser environments.

Dimensions: (Unit:mm)



Technical parameters:

Product Name (Magnification)	Numerical aperture NA	Working distance WD (mm)	Focal length f(mm)	Resolution R(μm)	Depth of field ±D.F. (μm)	Object field of view (mm)
M Plan Apo 10X	0.28	34	20	1	3.5	Φ2.4
M Plan Apo 20X	0.3	23.3	10	2.16	7.2	Φ1.3
M Plan Apo 50X	0.42	16.5	4	1.29	2.59	Φ0.52
M Plan Apo 100X	0.8	3.3	2	0.34	0.6	Φ0.24

UV Industrial Achromatic Objective

Intane's UV Industrial Achromatic objectives are specifically designed for high-performance applications in the ultraviolet spectrum, with the ability to observe surfaces in a coaxial alignment with laser beams. These objectives offer excellent UV response characteristics and are ideal for microscopic observation and the convergence of visible lasers.

Key Features:

- Superior UV transmission: Transmits more than 70% across the 220 nm - 900 nm wavelength range, ensuring excellent performance in various UV applications.
- No refocusing required: Once focused with visible light, no additional refocusing is needed for UV observations, simplifying the workflow.
- Apochromatic design: Ensures clear and sharp imaging in both the ultraviolet and visible light ranges, with minimal image distortion for precise results.
- Long working distance: Ideal for use in coaxial observation systems or laser introduction optical systems, providing flexibility in a variety of applications.

UV Warning Lens

The UV Warning Lens is designed to provide an expansive field of view, exceptional resolution, and minimal distortion. With a 93°×93° field of view, this lens is ideally suited for applications in UV guidance, UV communication, and related fields. Its system offers superior sensitivity, a low false alarm rate, compact size, lightweight construction, and a simple design, all while eliminating the need for refrigeration.

Technical parameters:

Type	Focal length f(mm)	Field of view	Working wavelengt	Working distance WD(mm)	distortion
Wide spectrum UV lens	9.2mm	Image size Φ18mm (90°)	254±20nm	0. 2m~∞	⩽2%
Fixed focus UV lens	80mm	Image size Φ28mm	250~380nm	137.5mm~∞	⩽2%
Wide angle UV lens	9.2mm	Image size Φ18mm	254±20nm	0. 2m~∞	⩽2%
Continuous zoom UV lens	80mm~640mm	Image size Φ20mm	250~380nm	5m~∞	⩽1%
Solar Blind UV Warning Lenses	60mm	93°×93°	The single-side transmittance of the lens element is better than 99%	100mm~∞	70% field of view Distortion less than 30%
Apochromatic UV Lenses	60mm	93°×93°	260nm~350nm	Interval:±0.008mm	Eccentricity：±5″

29X Water Immersion Objective

The 29X Water Immersion Objective offers a 0.55 numerical aperture (NA) with infinite conjugate design, combining low magnification with a high numerical aperture for superior imaging. Designed for use with water as the observation medium, this objective provides excellent performance across both macro and micro-scale imaging, featuring an ultra-long working distance and outstanding fluorescence imaging capabilities.

Key Features:

- 29X magnification with a 0.55 NA, delivering high resolution and excellent contrast.
- Infinite conjugate design for superior optical performance.
- Water immersion for optimal clarity in the visible light spectrum.
- Long working distance that ensures easy handling and flexibility in observation.
- Exceptional fluorescence imaging: High numerical aperture and low magnification enable bright, detailed imaging from macro to micro scales.
- Flat-field imaging in the visible light spectrum for clear and precise results.

High Efficiency Focusing Lens

The High Efficiency Focusing Lens offers 20X magnification and a 0.5 numerical aperture (NA), with a 9 mm working distance. Designed for use in the 1064 nm and 532 nm wavelength bands, this lens is ideal for semiconductor circuit processing, including cutting, trimming, marking, and insulating film removal, as well as repair of LCD color filters.

Key Features:

- 20X magnification with a 0.5 NA, ensuring efficient light focus for high-quality processing.
- 9 mm working distance, providing flexibility for precise operations.
- Wide wavelength compatibility: optimized for 1064 nm and 532 nm bands, suitable for a variety of laser-based applications.
- Laser irradiation resistance: Built to withstand high-power laser exposure, enhancing durability and extending service life.
- Long service life: Designed for reliability in demanding industrial environments.

High Numerical Aperture Microscope Lens

This high-performance microscope lens features a numerical aperture (NA) of 0.6 and a focal length of 30 mm, with a working distance of 21.5 mm. The lens operates across a broad spectral range from 400 nm to 1100 nm and is designed to perform optimally in environments with temperatures ranging from -10°C to +35°C.

Engineered for durability, this lens offers excellent resistance to temperature fluctuations and vibrations. It achieves the diffraction limit at its maximum aperture, ensuring exceptional resolution and image clarity. The lens is fully compatible with Thorlabs' cage systems, making it an ideal choice for versatile and high-performing optical setups.

Manual Focus Lens

We offer two precision manual focus lenses, each designed for specific optical applications:

1.Visible Light Lens
- Wavelength Range: 633 nm
- Entrance Pupil Diameter: 40 mm

2.Medium-Wave Infrared Lens
- Wavelength Range: 3.39 μm
- Entrance Pupil Diameter: 60 mm

Both lenses provide a focal length adjustment range from ±500 mm to infinity, with focusing coaxiality precision exceeding 0.02 mm. These lenses are engineered to deliver high accuracy and reliable performance across their respective spectral bands.

Display Inspection Lens

This high-performance lighting lens is designed to produce a square light spot, ideal for detection applications. Two specifications are available:

1.Specification 1
- Spot Size: 840 x 840 mm
- Working Distance: 1200 mm

2.Specification 2
- Spot Size: 250 x 250 mm
- Working Distance: 500 mm

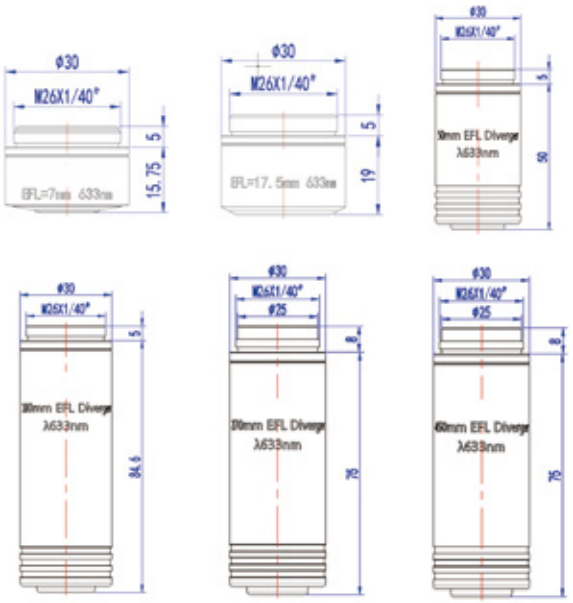
Both lenses offer superior performance with low distortion, no color shift in the light spot, excellent spot uniformity, and high temperature resistance. These lenses are specifically designed for use in LCD panel inspection, ensuring precise and consistent lighting for high-quality analysis.

Interferometer Lenses

Dynamic Interferometer Lens

- Suitable for measuring optical components and systems, easy to locate and install, ideal for measuring large aperture optical systems such as concave telescopes, lenses, and long focal length systems;
- Suitable for harsh environments and difficult inspections, measurement speed is limited only by exposure time and not by CCD frame rate;
- Insensitive to vibration, reducing the impact on airflow;
- Large-size optics and system design to meet the inspection needs of different specifications;
- Matching 4D Technology Interferometer.

Dimensions:



Technical parameters:

Model NO	EFL (mm)	Wavelength (λ)	Clear Aperture	Pupil focusing range	Accuracy (PV)
P18TS010	EFL=7mm	632.8nm	9mm	±12.5mm	λ/10
P18TS013	EFL=9mm	632.8nm	9mm	±12.5mm	λ/10
P18TS020	EFL=14mm	632.8nm	9mm	±12.5mm	λ/10
P18TS025	EFL=17.5mm	632.8nm	9mm	±12.5mm	λ/10
P18TS030	EFL=21mm	632.8nm	9mm	±12.5mm	λ/15
P18TS039	EFL=27mm	632.8nm	9mm	±12.5mm	λ/15
P18TS050	EFL=35mm	632.8nm	9mm	±12.5mm	λ/15
P18TS064	EFL=45mm	632.8nm	9mm	±12.5mm	λ/15
P18TS077	EFL=54mm	632.8nm	9mm	±12.5mm	λ/15

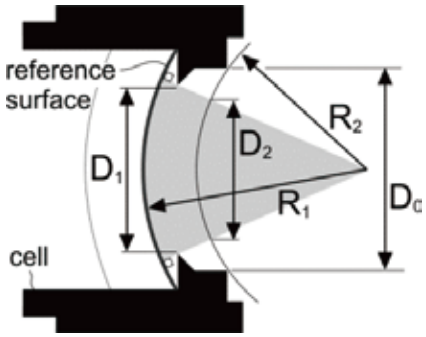
Model NO	EFL (mm)	Wavelength (λ)	Clear Aperture	Pupil focusing range	Accuracy (PV)
P18TS086	EFL=60mm	632.8nm	9mm	±12.5mm	λ/15
P18TS090	EFL=63mm	632.8nm	9mm	±12.5mm	λ/15
P18TS100	EFL=70mm	632.8nm	9mm	±12.5mm	λ/15
P18TS103	EFL=72mm	632.8nm	9mm	±12.5mm	λ/15
P18TS114	EFL=80mm	632.8nm	9mm	±12.5mm	λ/15
P18TS116	EFL=81mm	632.8nm	9mm	±12.5mm	λ/15
P18TS129	EFL=90mm	632.8nm	9mm	±12.5mm	λ/15
P18TS143	EFL=100mm	632.8nm	9mm	±12.5mm	λ/15
P18TS171	EFL=120mm	632.8nm	9mm	±12.5mm	λ/15

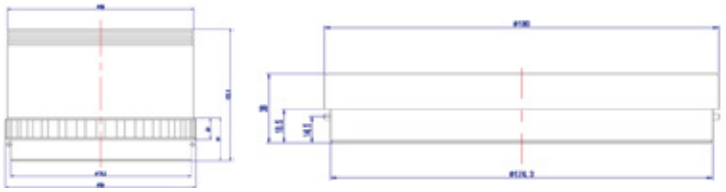
Intane Optics offers a range of calibers and FA variety interferometer lenses, suitable for use with Fizeau and dynamic interferometers. These instruments enable high-precision standard measurements of optical components or systems with exceptional optical performance.

Key features include:

- Standard Mirrors: Available in various precision levels to accommo-
- date different testing requirements.
- Universal Mechanical Design: The adaptable buckle design is compat-
  ible with interferometers from multiple brands.
  Customization: Special performance options are available upon request to meet specific needs.

Dimensions:



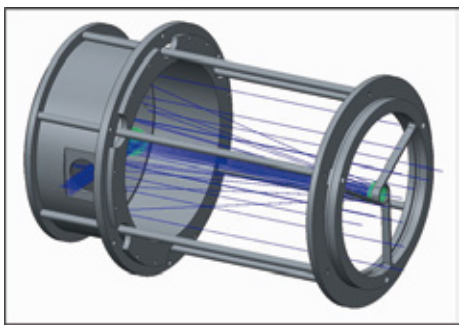


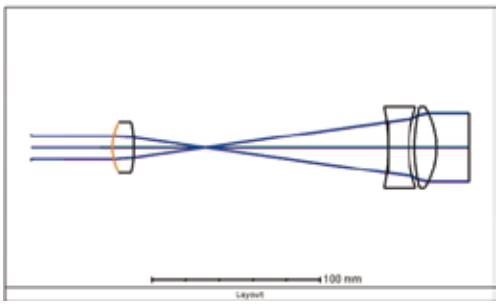
4 inch interferometer lens　　6 inch interferometer lens

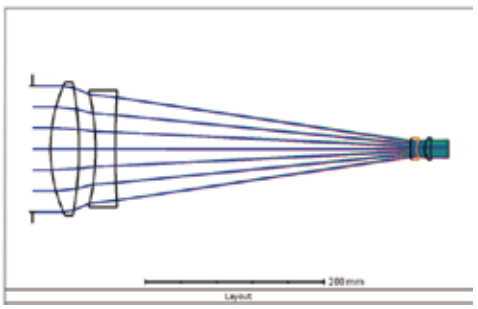
Technical parameters:

f/#	D0 (mm)	D1 (mm)	D2 (mm)	R1 (mm)	R2 (mm)
0.75	57	57	56.6	44.59	44.26
1.5	98.4	88	83.7	127.64	124. 36
3	136.5	136.5	136.5	409.87	409.87
3. 3	102	94	91	298	292.75
5.6	106	100	97.2	554.6	550.3
7.1	105.9	100	96.8	689.86	685.99
10.7	108.2	103	99.2	1093.86	1087.71

Beam Expander Lens







Intane Optics offers a range of beam expanders designed for beam expansion applications. Featuring anti-reflection coatings and high transmission efficiency, these expanders provide fixed magnification from 2X to 20X.

- Excellent Transmitted Wavefront Characteristics: Ensures high-quality beam expansion with minimal distortion.
- Compact Structure Design: Optimized for space-saving and ease of integration.
- Narrowband and Broadband Options: Available to suit a variety of application scenarios.
- Versatile Interface Compatibility: Can be equipped with various interfaces to meet system requirements.
- Customization: Special performance configurations available upon request.

3X Beam Expander Lens

Magnification: 3X
Working Band: 400 ~ 1100 nm
Aperture:
- Incident Beam Diameter: 12 mm
- Outgoing Beam Port: 36 mm

8X Beam Expander Lens

Magnification: 8X
Working Band: 1050 nm ~ 1090 nm
Aperture:
- Incident Beam Diameter: 140 mm
- Outgoing Beam Diameter: 17.5 mm

Beam Expansion Ratio: 8X @ 1050 nm

12X Beam Expander Lens

Magnification: 12X
Working Band: 632.5 nm
Aperture:
- Incident Beam Aperture: 7 mm
- Outgoing Beam Diameter: 82 mm

Beam Expansion Ratio: 12X @ 632.8 nm

Collimating lens

1550 mm Collimating Lens

Working Wavelength: 1530 ~ 1560 nm
Optical Fiber: Single-mode, core diameter 9 μm, NA = 0.14
Effective Diameter: 17 mm
Focal Length: 59.5 mm

808 mm Collimating Lens

Working Wavelength: 785 ~ 830 nm
Optical Fiber: Multimode, core diameter 62.5 μm, NA = 0.22
Effective Caliber: 12.5 mm
Focal Length: 33 mm

Wideband Collimating Lens

Receiving Optical Path: Single-mode fiber
Working Wavelength: 780 ~ 1560 nm
Optical Fiber: Single-mode, core diameter 9 μm, NA = 0.14
Effective Diameter: 10 mm
Focal Length: 36.7 mm

6X High Power Laser Water-Cooled Collimating Lens

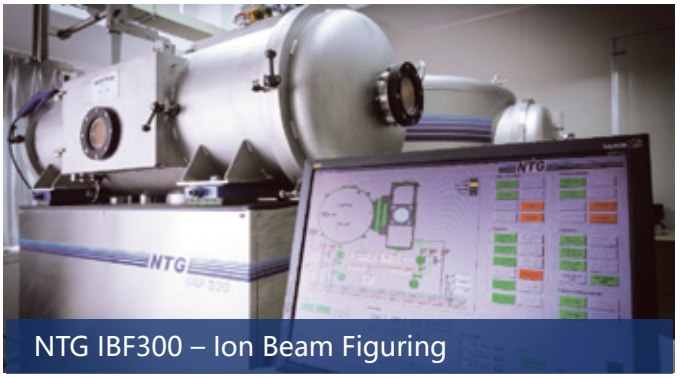
Magnification: 6X
Working Band: 1080 nm
Aperture:
- Incident Beam Aperture: 6 mm
- Outgoing Beam Port: 36 mm

Power: Designed for laser power up to 500 W
Cooling: Water cooling system

High-precision polishing workshop

Satisloh Edge Grinder

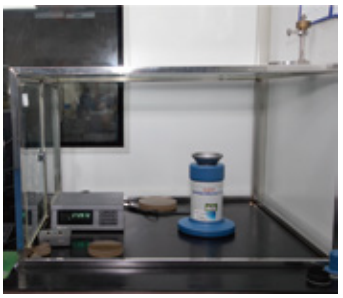
Lens Centering & Edging Machine



NTG IBF300 – Ion Beam Figuring

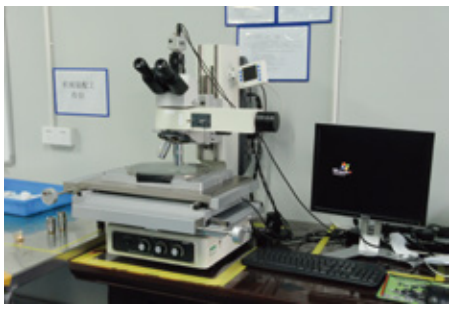
Ultra-clean coating line

Interferometric Testing

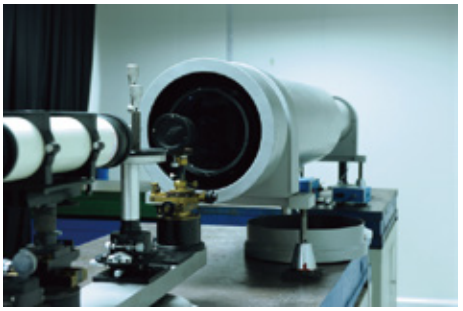


Trioptics Spherometer

Taylor Hobson
non-contact profilometer



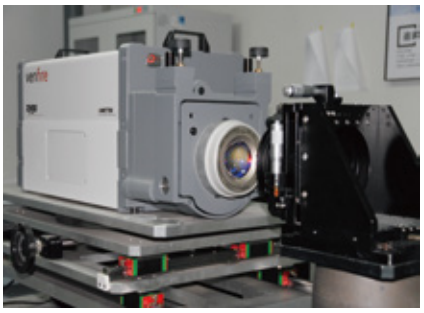
Microscope



Collimator

4D Dynamic interferometer 6000

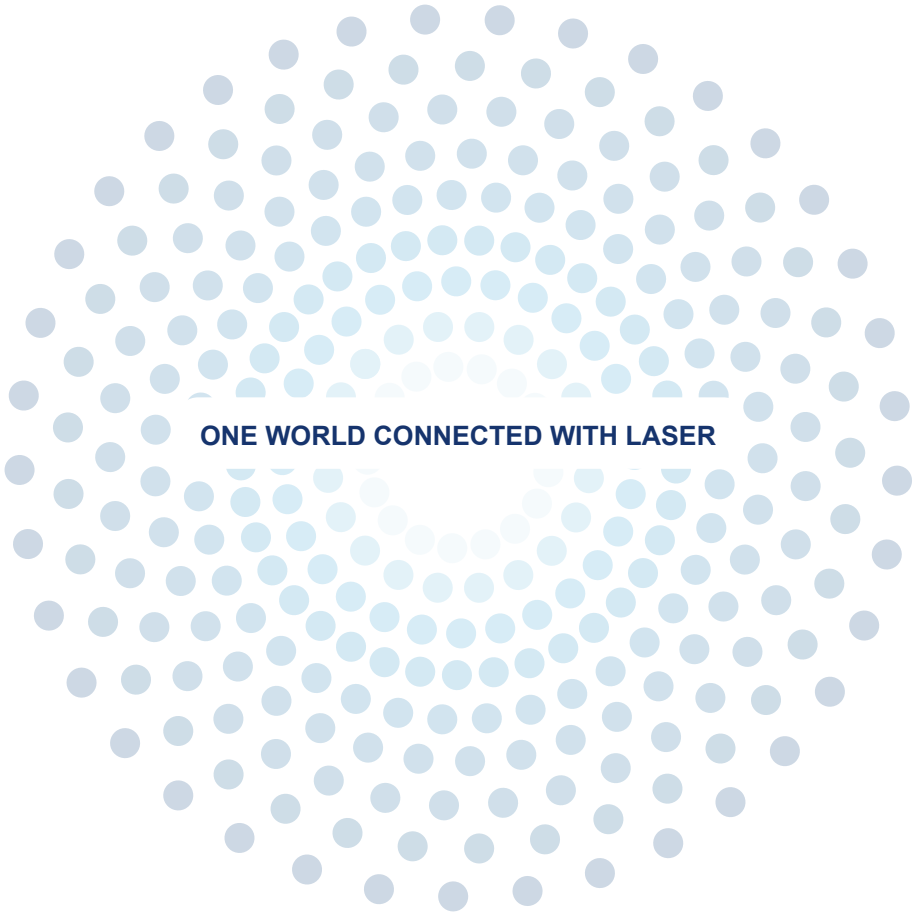
4D Dynamic interferometer 4020



4" ZYGO Verifire™ laser interferometer

Trioptics centration test device

Optical Assembly



Brochure series:

Ultra-precision Optical Elements
Precision Optical Lens Assembly
Large-size Precision Optical Elements
Precision Optical Coating Solution
Collimators
Satellite Laser Communication System Solution

Intane OPTICS® 英田光学
ONE WORLD CONNECTED WITH LASER
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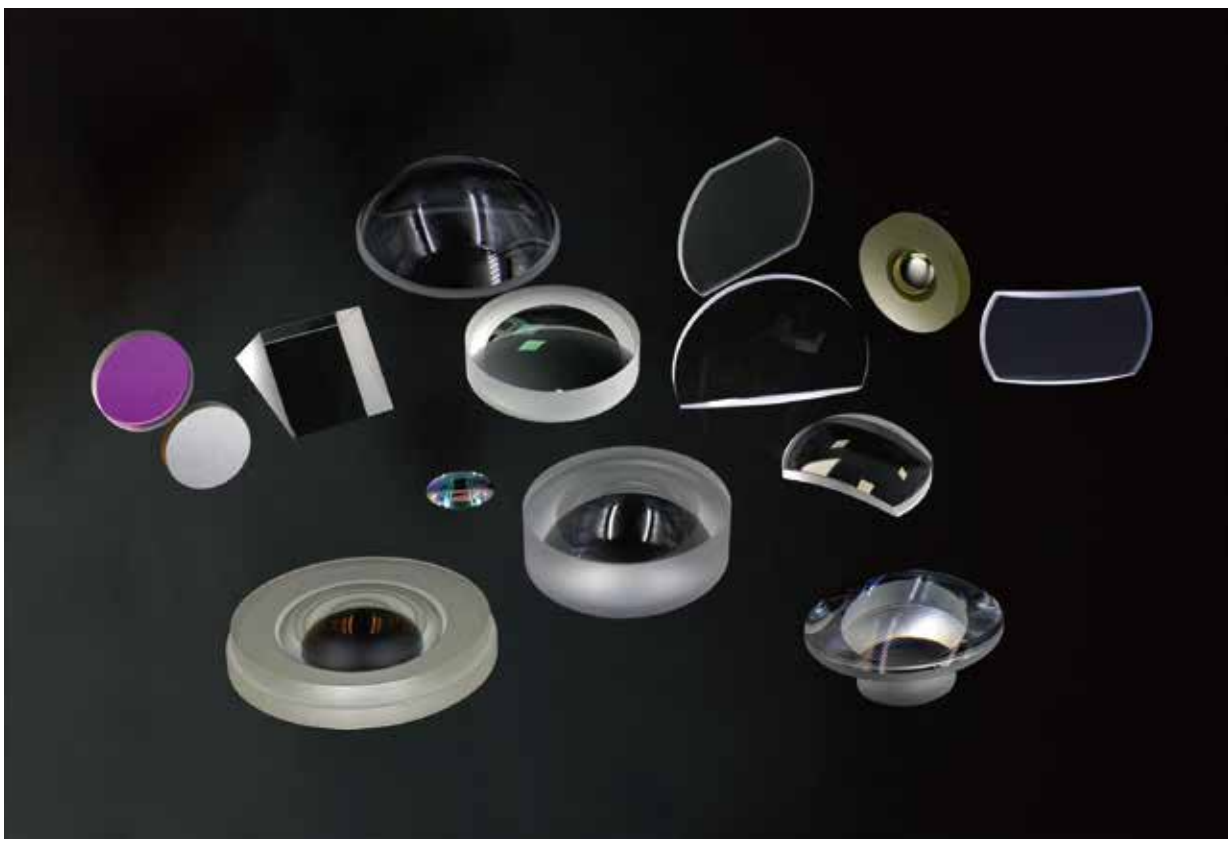
Email: alice.hsia@intaneoptics.com

Intane OPTICS® 英田光学

Ultra-precision Optical elements



Company profile

Intane Optics was founded in 2003 by Professor Zhou Bifang, the former director of Nanjing Astronomical Instruments Research Center, the Chinese Academy of Sciences. Intane Optics is a national high-tech enterprise with precision optical systems solutions at its core competency. The company boasts a team of experienced engineers in precision optical engineering, with proven technological capabilities ranging from complex system design, integration, assembly, testing to the manufacturing of key optical components.

Advanced optical elements are the core components that determine the performance of precision optical instruments. As technology and requirements develop, there are increasingly higher demands for the performance of advanced optical elements.

Intane Optics is actively engaged in research on ultra-precision optical component processing technology. With internationally advanced polishing and testing equipment, combined with self-developed CNC equipment, our experienced technicians team is constantly taking on challenges of high-performance optical component manufacturing with increasing difficulty. We have achieved full-spectrum nano-scale processing accuracy in the manufacturing of optical aspherics, spheres, planes, cylinders, and windows. Through high-performance optical coating, our products feature long life, high reliability, high strength, and diversity of optical components.

Based on high-precision optical components, Intane Optics also has developed a series of high-precision optical testing instruments and equipment. Collimators of various aperture and specifications have a good reputation among customers. Intane Opics: Your trusted supplier for precision optical system solutions.

Contents

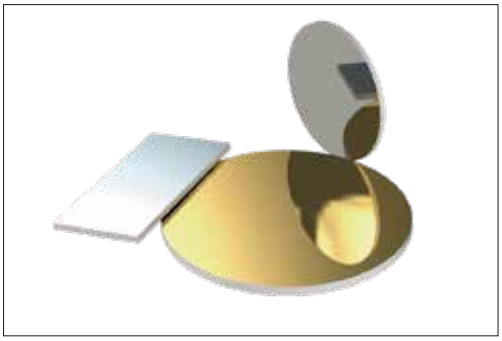
ONE WORLD CONNECTED
WITH LASER

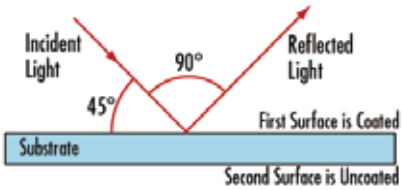
Plane mirror

Plane mirrors are commonly employed in applications such as beam steering, interferometry, imaging, and Illumination. The substrates, typically made from glass or metal, undergo precision surface polishing. When beams are directed onto these surfaces, they undergo specular reflection.

Optical Flat

Optical flats are essential components for beam steering, interferometry, and as optical elements in imaging systems. Key parameters such as surface flatness and reflectivity play a critical role in performance. High surface precision minimizes light loss caused by dispersion, ensuring optimal efficiency and clarity.

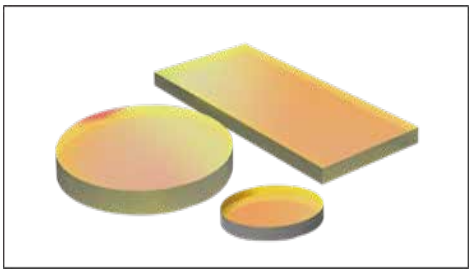




Material	Precision-annealed H-K9L optical glass/fused quartz/glass ceramics	
Surface accuracy	K9 standard precision plane reflectors K9	λ/20 PV@633nm
	K9 high precision/fused silica high precision plane reflectors K9	λ/20 PV@633nm
	Fused silica quartz standard precision plane reflectors	λ/20 PV@633nm
	Economical plane reflectors	4-6 λ/20@633nm
Parallel error	<3′	
Surface quality	K9 standard precision/fused silica standard urface quality	40/20-60/40 S&D
	Fused Silica with high Surface quality	Up to 10-5 S&D
	Economical plane reflectors	80-50 S&D
Back	Fine ground/figuring	
Dimension tolerance	K9 standard (high) precision/fused silica (high) precision plane reflectors	±0.01mm
	Economical plane reflectors	±0.01mm
Thickness tolerance	K9 standard (high) precision/fused silica (high) precision plane reflectors	±0.01mm
	Economical plane reflectors	±0.01mm
Beveling	K9 standard (high) precision/fused silica (high) precision plane reflectors	Any angle by manual grinding
	Economical plane reflectors	0.2-0.5mm x 45°
Coatings	As per customer's request	

*Both the dimensions and coatings of our products can be fully customized to meet specific requirements, ensuring optimal performance for your unique application.

Cold/hot mirror



Cold/Hot mirrors for Visible and Infrared Light Separation old and hot reflectors are designed to separate visible light and infrared light in light sources or signals. By reflecting or transmitting only visible light, they effectively mitigate the rise in system temperature caused by infrared radiation.

Spectral Characteristics:

Hot mirrors: These reflect near-infrared light while allowing visible light to pass through with high transmittance. This helps reduce heat buildup, minimizing thermal impact on system performance.

Cold mirrors: These reflect visible light and allow near-infrared light to pass through with high transmittance, enhancing efficiency in systems sensitive to heat.

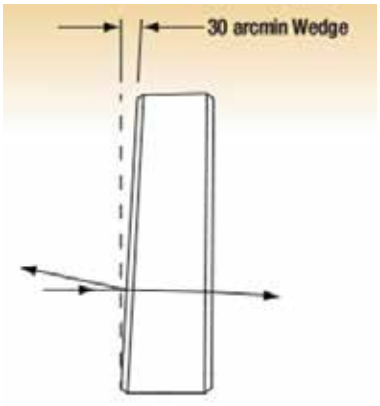
By optimizing the reflection and transmission of light based on wave-length, both types of reflectors contribute to improved thermal management and overall system performance.mance of systems performance.

Material	Schott Borofloat borosilicate glass, quartz glass,Fused Silica	
Surface accuracy	λ/10 PV @633nm	
Parallel error	<1′	
Surface quality	Hot reflector	60-40 S&D
	Cold reflector	60/40 S&D
Diameter tolerance	Hot reflector	±0.01mm
	Cold reflector	±0.01mm
Thickness	As per customer’s request	
Transmittance	Tavg > 90%	
Reflectivity of visible light	Hot reflector	Ravg > 95%@750-1150nm
	Cold reflector	Ravg > 95%@425-675nm
Angle of incidence	Hot reflector	0°/45°
	Cold reflector	0°/45°

Optical window

Wedged window

A wedged window has an angle of 30″between two unparallel planes, avoiding the interference effect due to light reflection by the front and back surfaces of a high-parallelism window, and problems such as poor stability and mode hopping of laser output due to optical interference feedback by the laser resonator. Wedged windows are usually used to make incident beam deviate by certain angles toward the designated directions. When used in a pair, relative rotation of the two optical wedges can make the emergent beam situated in any direction in a pyramid taking the incident beam as its axis.

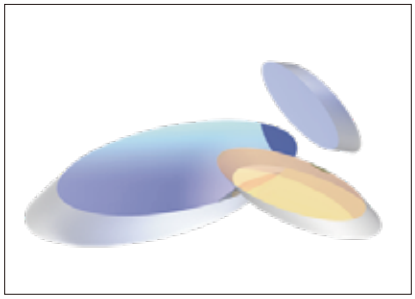


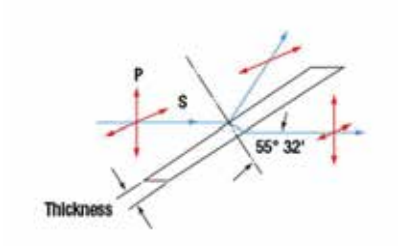
Material	K9/Fused Silica
Surface accuracy	λ/10 PV @632.8nm
Wedge angle	30 arcmin±10 arcmin
Diameter tolerance	+0.0/-0.1mm
Thickness tolerance	±0.02mm
Surface quality	20/10 S&D
Bevel	0.2 ~ 0.5mm x 45°
Coating	As per customer's request

*Both the dimensions and coatings of our products can be fully customized to meet specific requirements, ensuring optimal performance for your unique application.

Brewster window

Brewster windows are uncoated substrates that can be connected in series as polaroids, or used for improving the degree of polarization of some polarized light. If a Brewster window is placed at the Brewster angle and a beam transmits through it, the P polarized component of the beam has no reflection loss and the S polarized component of the beam is partially reflective.





Material	Fused Silica
Surface accuracy	λ/10 PV @632.8nm
Parallel error	<5 Arc Seconds
Diameter tolerance	+0.0/-0.1mm
Thickness tolerance	±0.02mm
Surface quality	10/5 ~ 20/10 S&D
Bevel	0.2 ~ 0.5mm x 45 °
Brewster angle	55 °32′@633nm
Coating	As per customer's request

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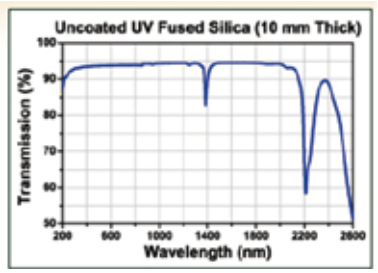
Ultraviolet and inferred window

UV and IR Windows are precision optical components designed for optimal performance in the Ultraviolet (UV) and Infrared (IR) spectrums.
UV Windows are specifically designed for applications requiring high transmission and minimal distortion in the ultraviolet range. These windows are commonly utilized in laser systems, where their precision and durability ensure optimal functionality, making them indispensable for a variety of scientific and industrial uses.
IR Windows, on the other hand, are optimized for infrared wavelengths and are widely employed in advanced optical systems. Their applications include Fourier Transform Infrared (FTIR) spectroscopy, where accurate spectral analysis is critical, as well as in thermal imaging systems and Forward-Looking Infrared (FLIR) technology. These windows excel in environments requiring high thermal resistance and exceptional optical clarity, providing reliable performance across a broad range of conditions.



Material	K9/Fused Silica/sapphire/Ge/CaF2/ZnSe, etc.	
Surface accuracy	K9	λ/10 PV @632.8nm
	Ultraviolet quartz	λ/10 PV @632.8nm
	Sapphire	λ/10 PV @632.8nm
	Ge	λ/10 PV @632.8nm
	CaF_2	λ/8 PV @632.8nm
	ZnSe	λ/6 PV @632.8nm
Parallel error	K9	<30″
	Ultraviolet quartz	<30″
	Sapphire	<30″
	Ge	<30″
	CaF_2	<45″
	ZnSe	<45″
Thickness tolerance	K9/ultraviolet quartz	±0.01mm
	CaF_2	±0.03mm
Diameter tolerance	+0.0/-0.1mm, +0.0/-0.2mm (CaF_2)	
Surface quality	K9	40/20 ~ 60-40 S&D
	Ultraviolet quartz	40/20 ~ 60-40 S&D (standard), 10/5 ~ 20/10 (high precision)
	Sapphire	60/40 S&D (standard), 40-20 (high precision)
	Ge	60/40 S&D
	CaF_2	60/40 S&D
	ZnSe	60/40 S&D
Bevel	0.2 ~ 0.5mm x 45°	

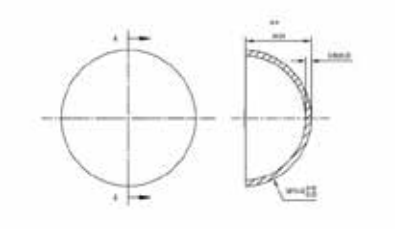
*Both the dimensions and coatings of our products can be fully customized to meet specific requirements, ensuring optimal performance for your unique application.

Dome window

Dome windows are protective windows shaped in hemispherical shells. They are usually used for articles with large-angle incident beams, such as detectors and optical sensors.

Material	K9/Fused Silica
Surface accuracy	λ/4 PV @632.8nm
Diameter tolerance	+0.0/-0.2mm
Thickness tolerance	±0.02mm
Surface quality	60 /40 S&D
Bevel	0.2 ~ 0.5 mm x 45°
Coating	As per customer's request

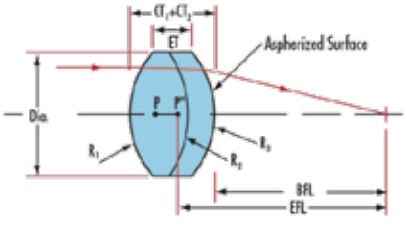
*Both the dimensions and coatings of our products can be fully customized to meet specific requirements, ensuring optimal performance for your unique application.



Achromatic lens

Positive achromatic lens

Positive achromatic lenses are high-performance doublets designed with positive focal lengths. These lenses are specifically engineered to correct chromatic aberrations, significantly reducing or even eliminating color distortion, ensuring superior image quality and accuracy.

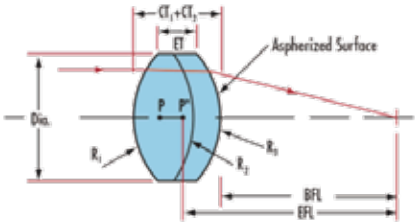


Diameter tolerance	+0.0/-0.1mm
Center thickness tolerance	±0.01
Surface accuracy	λ/10PV@632.8nm
Effective focal length tolerance	±2%
Centering tolerance	30″
Surface quality	40-20 ~ 60-40 S&D
Bevel	0.2mm x 45°
Coating	As per customer's request

* Both the dimensions and coatings of our products can be fully customized to meet specific requirements, ensuring optimal performance for your unique application.

Negative achromatic lens

Negative achromatic lenses are precision doublets featuring negative focal lengths. These lenses are designed to correct chromatic aberrations, effectively reducing or even eliminating color distortion, thus enhancing optical performance and image clarity.



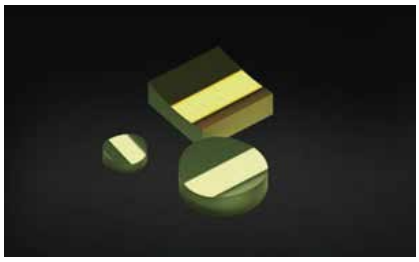
Diameter tolerance	+0.0/-0.1mm
Center thickness tolerance	±0.01
Surface accuracy	λ/10 PV @632.8nm
Effective focal length tolerance	±2%
Centration tolerance	30″
Surface quality	40-20 ~ 60-40 S&D
Bevel	0.2mm x 45°
Coating	As per customer's request

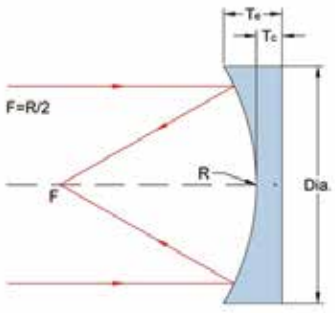
* Both the dimensions and coatings of our products can be fully customized to meet specific requirements, ensuring optimal performance for your unique application.

Cylindrical mirror

Cylindrical mirror

A cylindrical mirror features a cylindrical surface that converges parallel incident beams into a line. Its positive focal length is half the radius of curvature of the cylindrical surface, making it ideal for light focusing and shaping applications.





Material	Precision-annealed H-K9L , Fused Silica， Ceramics
Surface accuracy	λ/4 PV @633nm
Parallel error	<1′
Surface quality	40/20 ~ 60/40 S&D
Dimension tolerance	+0.0/-0.01mm
Thickness tolerance	±0.03mm
Focal length tolerance tolerance	±2%
Bevel	0.2mm x 45°
Coating	As per customer's request

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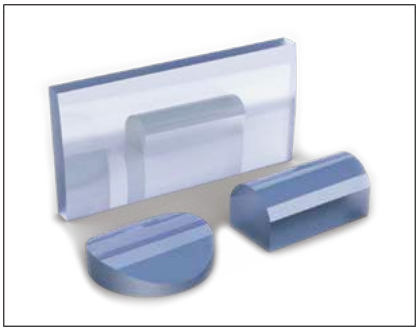
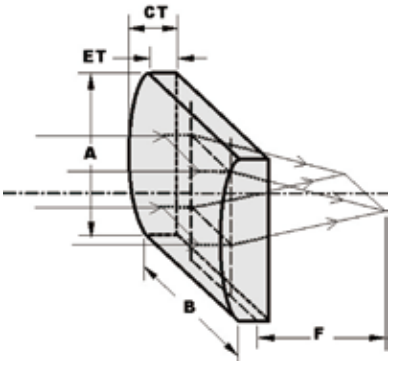
Plano-convex cylindrical lens

The plano-spherical lens provides symmetrical action on incident light in both directions, whereas the convex cylindrical lens affects the light in only one direction. A common application of the plano-convex cylindrical lens is to reshape a deformed beam, often using a pair of lenses in tandem. For example, a pair of positive plano-convex cylindrical lenses can be employed to collimate and round the output from a laser diode. Another application involves focusing a diverging beam onto a detector array with a single plano-convex cylindrical lens.

To minimize spherical aberration, when collimated beams are focused into a line, the collimated light should ideally strike the curved surface of the lens. Conversely, when using a quasi-linear light source, the line source should be directed onto the plane surface of the lens.



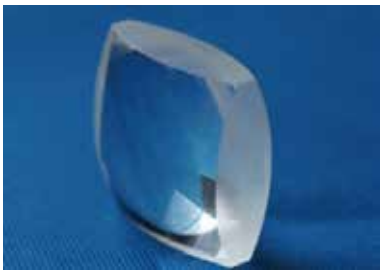
Material	Fused silica/H-K9L /CaF2	
Design wavelength	Fused silica/K9	587.6nm
	CaF_2	587.6nm
Diameter tolerance	Fused silica/CaF_2	+0.0/-0.05mm
	K9	+0.0/-0.05mm
Center thickness	±0.05mm	
Effective focal length tolerance	±2%	
Centering	3~5′	
Surface quality	Fused silica/K9	20/10 ~ 40/20 S&D
	CaF_2	40/20 ~ 60/40 S&D
Bevel	0.2mm x 45°	
Coating	As per customer's request	



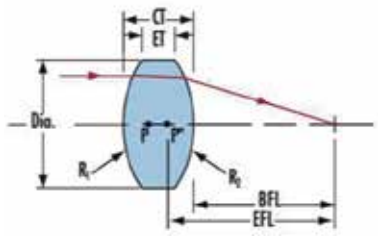
* Both the dimensions and coatings of our products can be fully customized to meet specific requirements, ensuring optimal performance for your unique application.

Biconvex cylindrical lens

Each biconvex cylindrical lens is composed of two convex surfaces. These lenses are commonly used in optical display systems, imaging systems, optical instruments, and laser systems to convert point light sources into linear light sources.



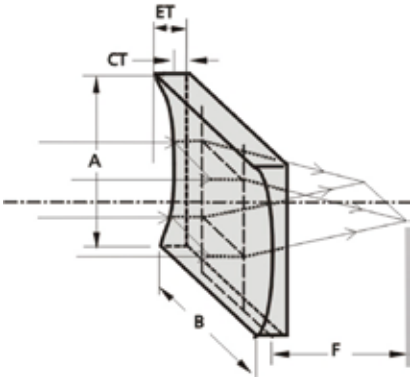
Material	K9/ultraviolet fused quartz
Design wave length	587.6nm
Outer diameter tolerance	±0.01/-0.05mm
Surface accuracy	λ/10 PV @632.8nm
Center thickness tolerance	±0.03mm
Effective focal length tolerance	±2%
Surface quality	20/10 S&D
Centration	<3arcmin
Bevel	<0.2mm x 45°
Coating	As per customer's request



*Both the dimensions and coatings of our products can be fully customized to meet specific requirements,ensuring optimal performance for your unique application.

Plano-concave cylindrical lens

A plano-concave cylindrical lens, featuring a plane surface and a concave cylindrical surface, has a negative focal length. These lenses are commonly used to converge parallel or divergent beams into a line or to modify the width-to-height ratio of images. They are particularly effective in transforming point light sources into linear light sources. Plano-concave cylindrical lenses are widely employed in applications such as laser scanners, spectroscopy, dye lasers, acousto-optics, optical processors, and other related fields.

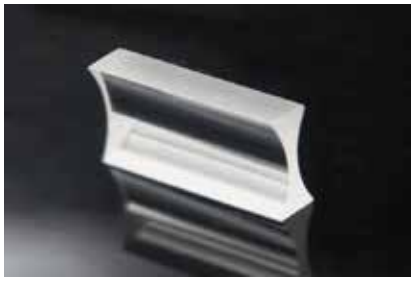


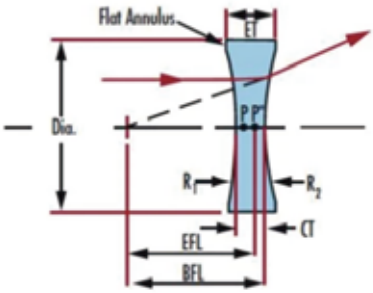
Material	Precision-annealed H-K9L optical glass/ultraviolet Fused silica	
Design wave length	587.6nm	
Dimension tolerance	K9/fused quartz	+0.0/-0.05mm
Center thickness tolerance	±0.03mm	
Effective focal length tolerance	±2%	
Surface quality	Fused silica /K9	20/10 ~ 40/20 S&D
Bevel	0.2mm x 45°	
Coating	As per customer's request	

* Both the dimensions and coatings of our products can be fully customized to meet specific requirements,ensuring optimal performance for your unique application.

Biconcave cylindrical lens

Biconcave cylindrical lenses are designed to modify image dimensions as needed, making them indispensable in applications requiring precise optical adjustments. These lenses are commonly employed in high-power laser systems and synchrotron radiation beams. With the demand for increasingly stringent component specifications, they are particularly well-suited for use in high-precision testing instruments and advanced optical systems, including high-power laser resonant cavities and long-range laser interferometric measurement systems.





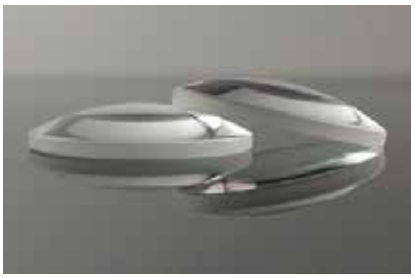
Material	K9/ultraviolet fused Silica
Design wave length	587.6nm
Outer diameter tolerance	±0.01/-0.05mm
Surface accuracy	λ/10 PV @632.8nm
Center thickness tolerance	±0.03mm
Effective focal length tolerance	±2%
Surface quality	20/10 S&D
Centration	<3arcmin
Bevel	<0.2mm x 45°
Coating	As per customer's request

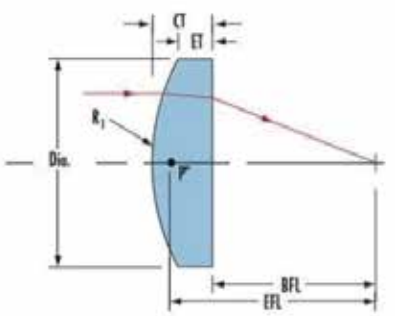
* Both the dimensions and coatings of our products can be fully customized to meet specific requirements, ensuring optimal performance for your unique application.

Spherical lens

Plano-convex spherical lens

Each plano-convex spherical lens operates based on the principle of light refraction, featuring a thick center and thin edge. These lenses have a positive focal length, with one flat surface and one convex surface. The thickness of the lens determines its specific application, such as in telescoping or converging light. Plano-convex spherical lenses are ideal for applications involving the collimation and focusing of monochromatic light.



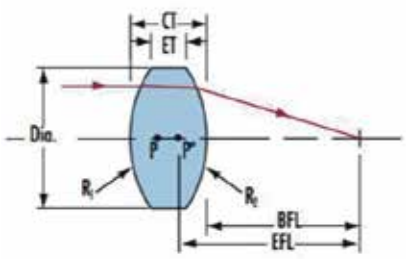


Material	K9/Fused silica/sapphire/Si/Ge/CaF2/LiF/BaF2/MgF2/ZnSe, etc.
Focal length tolerance	±1%
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Surface accuracy	λ/10 PV @632.8nm
Surface quality	20/10 S&D or better
Centration	<3arcmin
Clear Aperture	>90%
Bevel	<0.2x 45°
Coating	As per customer's request

* Both the dimensions and coatings of our products can be fully customized to meet specific requirements,ensuring optimal performance for your unique application.

Biconvex spherical lens

Biconvex spherical lens is a convex lens with convex surfaces on both sides, featuring a positive focal length. The lens has a longer focal length at its center and a shorter focal length towards its edges. Biconvex spherical lenses are primarily used for converging light from point sources or for transmitting images to other optical systems.



Material	K9//Fused silica/sapphire/Ge/CaF2/ZnSe, etc.
Focal length tolerance tolerance	±1%
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Surface accuracy	λ/10 PV @632.8nm
Surface quality	20/10 S&D or better
Centration	<3arcmin
Clear Aperture	>90%
Bevel	<0.2mm x 45°
Coating	As per customer's request

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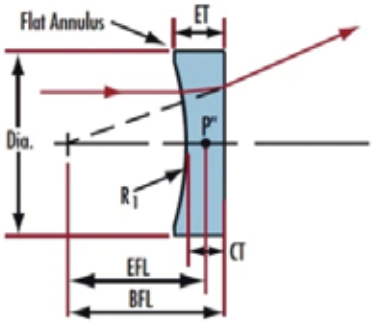
Plano-concave spherical lens

Plano-concave spherical lens features a negative focal length, with one side having a concave spherical surface and the other a flat surface. This design results in a lens that is thinner at the center than at the edges. Plano-concave spherical lenses are commonly used in optical systems for beam expansion, beam projection, and applications requiring an increase in focal length.

Material	K9/Fused silica/sapphire/ZnS/LiF/MgF_2/BaF_2/ CaF_2/ZnSe/Si/Ge, etc.
Focal length tolerance	±1%
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Surface accuracy	λ/10 PV @632.8nm
Surface quality	20/10 S&D or better
Centration	<3arcmin



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Meniscus lens

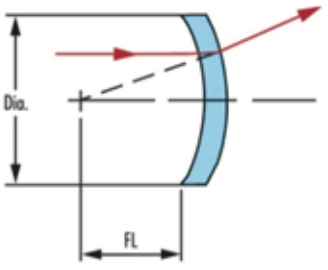
Eniscus lenses can be classified as either positive or negative, depending on their curvature and intended function. Constructed from high-quality materials such as K9 glass, ultraviolet fused silica, CaF2, or ZnSe, these lenses are essential for optimizing optical performance.

Positive meniscus lens is typically used to reduce the focal length of other lenses while maintaining the angular resolution of the optical system. It is often paired with another positive meniscus lens for enhanced focusing performance.

On the other hand, a negative meniscus lens is designed to minimize spherical aberrations. Featuring a convex surface and a concave surface with a larger radius of curvature, it is commonly used in combination with other lenses to reduce the numerical aperture (NA) of optical systems. Negative meniscus lenses are widely employed in beam expansion applications due to their ability to improve beam quality and reduce aberrations.

Both types of meniscus lenses play a crucial role in enhancing the performance and precision of optical systems.

Material	K9/Fused Silica/sapphire/Ge/CaF_2/ZnSe, etc.
Focal length tolerance	±1%
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Surface accuracy	λ/20 PV @632.8nm
Surface quality	20/10 S&D or better
Centration	<3arcmin
Clear Aperture	>90%
Bevel	<0.2 x 45°
Coating	As per customer's request



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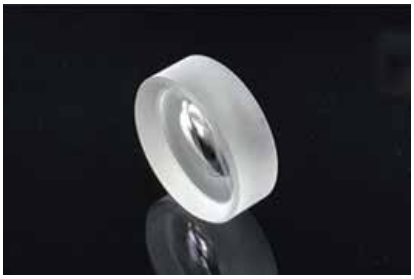
Biconcave spherical lens

A biconcave spherical lens features a negative focal length and causes light to diverge, earning it the designation of a diverging lens. These lenses are commonly used in applications such as beam expansion, projection systems, and other optical setups requiring light divergence.



Material	K9/Fused silica/sapphire/Ge/CaF2/ZnSe, etc.
Focal length tolerance	±1%
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Surface accuracy	λ/10 PV @632.8nm
Surface quality	20/10 or better
Centration	<3arcmin
Clear Aperture	>90%
Bevel	<0.2 x 45°
Coating	As per customer's request

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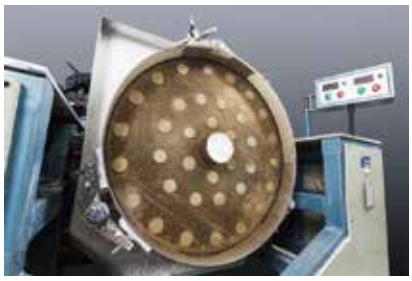
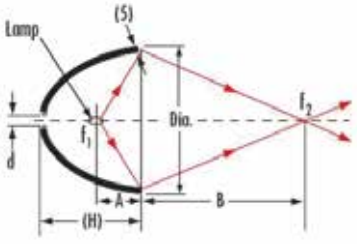
Aspheric Mirror

Elliptical mirror

An elliptical mirror features a planar reflecting surface with an elliptical outline. When positioned at a 45° angle in the light path, it creates a circular outline. This reflector is designed to converge light originatin- from or passing through one focal point to another, maintaining an aplanatic property between the two foci.





Material	K9/Fused Silica/Zerodur/CCZ HS
Surface accuracy	λ/80 RMS@633nm
Parallel error	<1´
Surface quality	Up to 40-20 S&D
Back	Fine ground
Dimension tolerance	+0.0/-0.05mm
Thickness tolerance	±0.05mm
Coating	Aluminum/silver/gold/dielectric high reflection coatings customizable for special wave bands

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Parabolic mirror

A parabolic mirror features a curved surface in the shape of a circular paraboloid, which is created by rotating a parabola around its axis. Due to this unique geometry, parabolic reflectors are highly effective in converging and focusing incoming rays, making them ideal for applications requiring precise light concentration.

Material	K9/Fused Silica/Zerodur/CCZ HS/SiC/Si
Dimension	15mm ~ 2000mm
Surface accuracy	λ/80 RMS @632.8nm
off axis angle	≤90 °
Surface quality	Up to 40-20 S&D
Surface roughness	Ra < 0.7nm or better
Dimension tolerance	±0.02mm
Focal length tolerance tolerance	±0.2%
Coating	Aluminum/silver/gold/dielectric high reflection coatings/ customizablefor special wave bands

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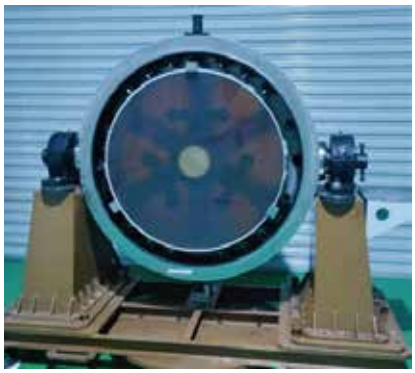
Hyperboloid mirror

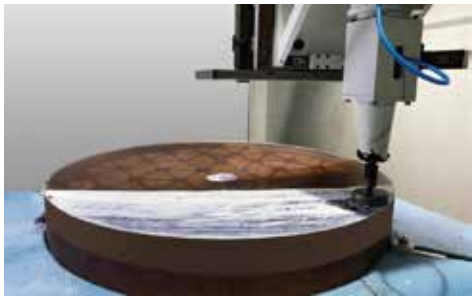
Hyperboloid mirrors feature two symmetrical curved surfaces, making them ideal for imaging and focusing applications. These reflectors are widely utilized in various fields, including cameras, telescopes, and solar power systems, where precision and efficiency are essential.



Material	K9/Fused Silica/Zerodur/CCZ HS
Focal length tolerance	±0.1%
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Surface quality	40/20 S&D
Centration	<3arcmin
Bevel	<0.2mm x 45°
Coating	Aluminum/silver/gold/dielectric high reflection coatings/ customizable for special wave bands

High-order aspheric mirror

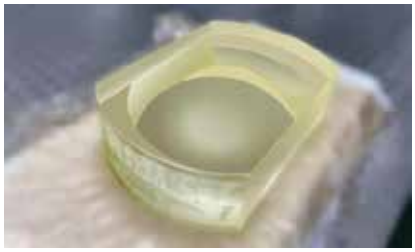
High-order aspheric mirrors feature complex surface profiles with significant curvature variations, which demand precise and advanced optical manufacturing techniques. Due to the intricacy of their surfaces, these reflectors require specialized processing routes and testing methods to meet stringent optical performance standards.



Material	K9/Fused Silica/Zerodur/CCZ HS
Size	15mm ~ 2000mm
Surface accuracy	Up to λ/80 RMS @632.8nm
Bevel	0.2mm x 45°
Dimension tolerance	0/-0.2mm
Thickness tolerance	±0.05mm
Coating	Aluminum/silver/gold/dielectric high reflection coatings/ customizable for special wave bands

Free form mirrors or lens

As a groundbreaking technology, free-form mirrors transcend the limitations of rotational symmetry inherent in traditional optical curved surfaces. They effectively correct asymmetrical aberrations in nonsymmetric optical systems, enabling the creation of high-performance, large-field-of-view, off-axis reflective imaging systems. Additionally, free form surfaces offer unparalleled design flexibility, overcoming complex spatial constraints. This allows for the development of diverse optical architectures that deliver high-performance imaging systems with compact structures, reduced volumes, and superior image quality.

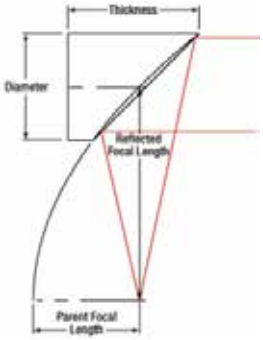


Material	K9/Fused Silica/Zerodur/CCZ HS
Focal length tolerance	±0.1%
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Surface quality	40/20 S&D
Centration	<3arcmin
Bevel	<0.2mm x 45°
Coating	Aluminum/silver/gold/dielectric high reflection coatings/ customizable for special wave bands

Off-axis parabolic mirror

Off-Axis Parabolic Mirrors (OAP) are advanced optical components with a parabolic surface that is offset from the optical axis, deviating from the mirror's central axis. This design allows OAP mirrors to reflect light to a focal point away from the optical axis, effectively minimizing or eliminating central aperture effects. By avoiding obstruction and reducing diffraction, OAP mirrors provide precise, aberration-free reflections. As a result, they are indispensable in high-precision optical applications, including astronomy, laser systems, and infrared optics.

Material	K9/Fused Silica/Zerodur/CCZ HS
Surface accuracy	λ/80 RMS @632.8nm
Deviation angle	90°
Surface quality	40/20 S&D
Surface accuracy	Up to λ/80 RMS @632.8nm
Dimension tolerance	0/-0.2mm
Focal length tolerance	±2%
Coating	Aluminum/silver/gold/dielectric high reflection coatings/ customizable for special wave bands



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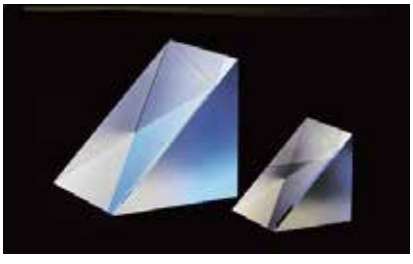
Prism

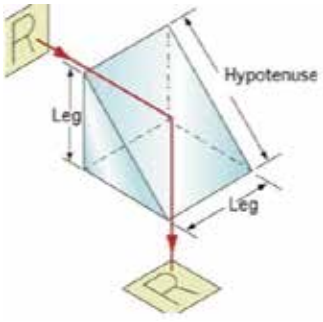
Prisms are transparent optical components, typically made of glass, designed to direct and manipulate light. By utilizing non-parallel surfaces, prisms refract light, altering the beam's direction based on the material's dispersion properties and the wavelength of the light. In certain applications, total internal reflection is employed, enabling precise beam control regardless of wavelength.

Right-angle prism

Right-angle prism mirrors are highly versatile optical components, widely used both as standalone prisms and as integral elements in optical assemblies. When light enters one of the legs of a right-angle prism mirror, the beam is deviated by a precise 90°. The prism's orientation allows for fine control over beam alignment. In the configuration where light enters the hypotenuse of the prism, the component is referred to as a Porro prism. In this setup, the light beam experiences a 180° deviation, which remains consistent along the azimuthal axis, while the prism's adjustment enables precise control over beam elevation.



Material	K9/quartz/sapphire/Ge/CaF_2/ZnSe, etc.
Surface flatness	λ/10 PV @632.8nm
Thickness tolerance	±0.02mm
Dimension tolerance	±1 Arc Seconds
Surface quality	20/10 S&D or better
Bevel	Protection bevel
Coating	As per customer's request



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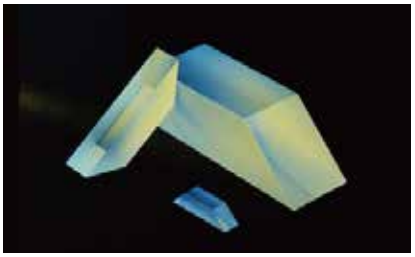
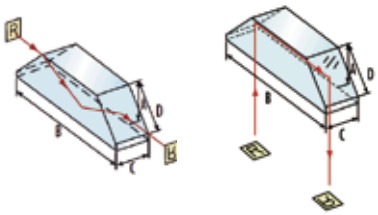
Dove prism

Dove prisms are modified right-angle prisms, with their triangular tops removed. They are commonly used to produce flipped, reversed, or rotary images, depending on the direction of ray incidence. These prisms can reverse images by 180°, earning them the alternate name of "image rotators." When an image rotates around the optical axis of a Dove prism, the rotation angle of the image is precisely twice that of the prism itself.
In applications where space is limited or easy installation is required, Dove prisms can effectively replace retro reflectors or right-angle prisms. An intriguing feature of Dove prisms is their ability to rotate an image by twice the angle through which the prism is rotated along its longitudinal axis. For optimal performance, Dove prisms should be used with collimated light.





Material	K9/quartz/sapphire/Ge/CaF2/ZnSe, etc.
Surface accuracy	λ/10 PV@632.8nm
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Surface quality	20/10 S&D or better
Parallelism	±1 Arc Seconds
Bevel	0.2mm x 45°
Coating	As per customer's request

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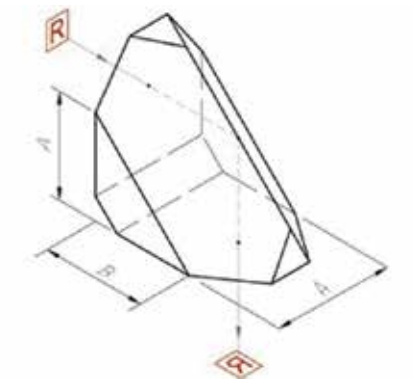
Roof prism

The roof prism features two reflecting surfaces arranged in a way that resembles a peaked roof in optical systems. This structure divides an incoming beam into two halves, effectively splicing the beam and then recombining it. As a result, the roof prism is often used for optical systems requiring beam deflection or image rotation.
Roof prisms are typically designed with a 90° deflection angle and can be found in various configurations, including as part of an Amici prism or a right-angle prism. The hypotenuse of the roof prism is trimmed to reduce size and weight, ensuring that it does not interfere with the clear aperture.
These prisms are commonly made from materials such as NBK7 or other suitable glass types, depending on the specific requirements of the application. When used in optical systems, the roof prism deflects an image both horizontally (right-to-left) and vertically (top-to-bottom), making it highly versatile for precise beam manipulation and alignment.



Material	K9/quartz/sapphire/Ge/CaF2/ZnSe, etc.
Surface accuracy	λ/10 PV @632.8nm
Clear aperture	>90%
Dimension tolerance	±0.02mm
Surface quality	20/10 S&D or better
Angle tolerance	±1 Arc Seconds
Bevel	<0.2mm x 45°
Coating	As per customer's request

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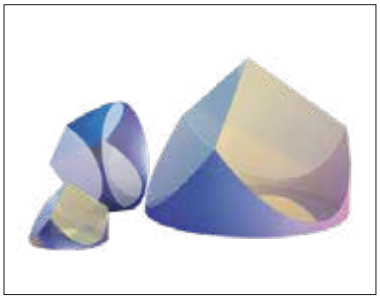
Pyramid prism

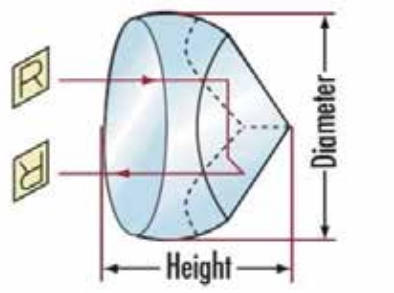
The Incident Pyramid Beam Prism is a precision optical component consisting of three glass parts, each with 90° angles, designed for retroreflection. It efficiently redirects incident beams back along their original paths, ensuring accurate and reliable retroreflection for a variety of applications.

This prism's design allows for total internal reflection, regardless of the angle of incidence, making it versatile in handling different beam entry directions. Commonly used in laser alignment, range finders, and other precision tasks, it ensures accurate beam direction even in challenging conditions.

The pyramid prism works by reflecting light through its three flat, reflective surfaces, and is particularly effective when light enters the rear surface of the prism. It can retro reflect light regardless of the incident angle, making it ideal for applications where precise beam alignment is crucial.

This type of retro reflector is especially suited for applications requiring high accuracy, such as optical alignment and high-precision measurements. It provides reliable performance even at large incident angles, making it suitable for a wide range of optical tasks across the visible light spectrum.





Material	K9/quartz/sapphire/Ge/CaF2/ZnSe, etc.
Surface accuracy	λ/10 PV @632.8nm
Clear aperture	>90%
Dimension tolerance	±0.02mm
Surface quality	20/10 or better
Angle tolerance	±1 Arc Seconds
Bevel	<0.2mm x 45°
Coating	As per customer's request

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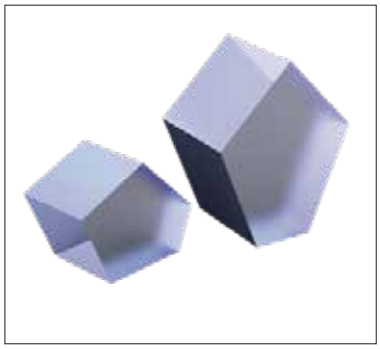
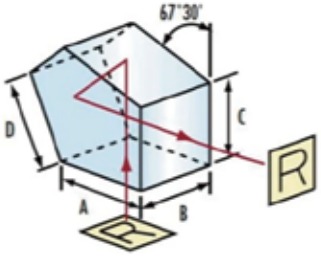
Pentagonal prism

Pentagonal prism is the beam Angle (90 °), one of the steering gear.It has two purposes: one is that no matter how much the first incident Angle on the side is the emergent light incident light steering Angle (90 °);The other is that, unlike a rectangular prism, the resulting image has neither rotation nor specular reflection.Pentaprism is commonly used in camera viewfinders, image observation systems or measuring instruments.

Characteristics of pentagonal prism is a 90° Angle of the light became a vertical incidence, and then after the 45 ° Angle of two surface reflection, from the Angle of 90 ° exit, on the other side of the incident light and emergent light is equal to 90 ° Angle, such application pentagonal prism can turn axis around 90 °. The pentagonal prism rotates around the horizontal axis for emergent light in the vertical plane sweep out a plane, and vice around the vertical axis rotation, can be measured in horizontal plane, when using laser as light source, because the laser range far, you can sweep out a big plane, this for housing construction, large engineering construction of planar measurement obviously is simple and convenient and of high precision, so the pentagonal prism needs more and more.





Material	K9/quartz/sapphire/Ge/CaF_2/ZnSe, etc.
Surface accuracy	λ/10 PV @632.8nm
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Surface quality	20/10 S&D
Parallelism	±1 Arc Seconds
Bevel	<0.2mm x 45°

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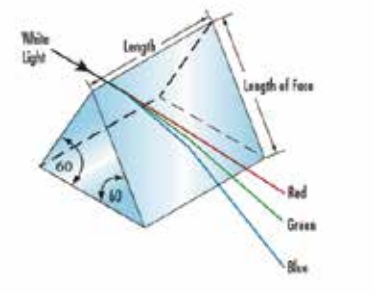
Triple prism

A triple prism is a transparent object surrounded by pairwise intersecting, unparallel planes.

Triple prisms are used to make beams split or get dispersion.



Material	K9/quartz/sapphire/Ge/CaF_2/ZnSe, etc.
Surface accuracy	λ/10 PV @632.8nm
Angle tolerance	±1 Arc Seconds
Dimension tolerance	±0.02mm
Surface quality	20/10 S&D
Clear aperture	>90%
Bevel	As per customer's request
Coating	As per customer's request

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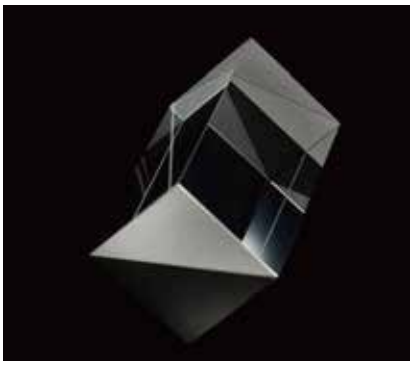
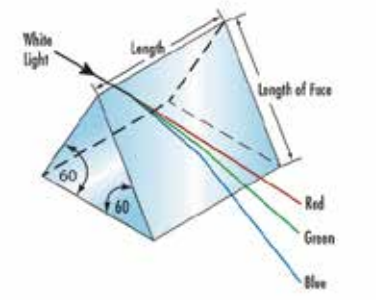
Equilateral prism

The three angles of an equilateral prism are all 60 °,It's Also called dispersing prism, equilateral prism can split light of different wave lengths,thus it is ideal for light dispersion.





Material	K9/quartz/sapphire/Ge/CaF_2ZnSe, etc.
Surface accuracy	λ/10 PV @632.8nm
Thickness tolerance	±0.02mm
Dimension tolerance	±0.02mm
Clear aperture	>90%
Surface quality	20/10 S&D
Parallelism	±1 Arc Seconds
Bevel	0.2mm x 45°
Coating	As per customer's request

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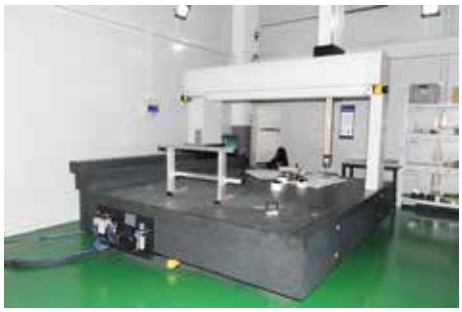
High-precision polishing workshop

Satisloh Edge Grinder

Lens Centering & Edging Machine

NTG IBF300 – Ion Beam Figuring

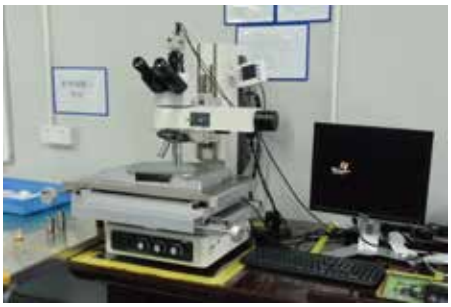
Ultra-clean coating line



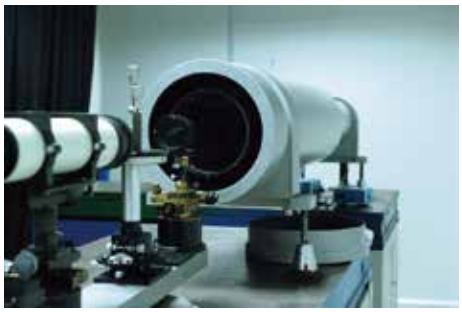
2.4m ZEISS PRISMO

600mm Plano Laser Interferometer

Taylor Hobson LUPHOScan non-contact profilometer



Microscope



Collimator

4D Dynamic interferometer 6000

4D Dynamic interferometer 4020

4″ ZYGO Verifire™ laser interferometer

1.78m Hindle Mirror

3D adjusting bracket

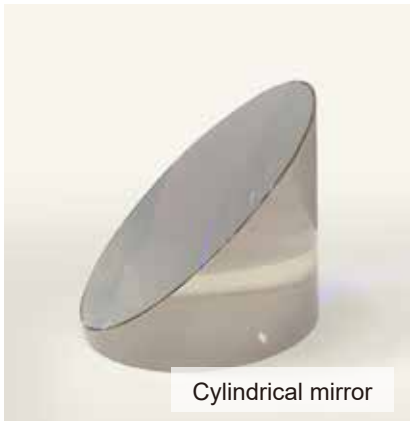

CaF_2 lens

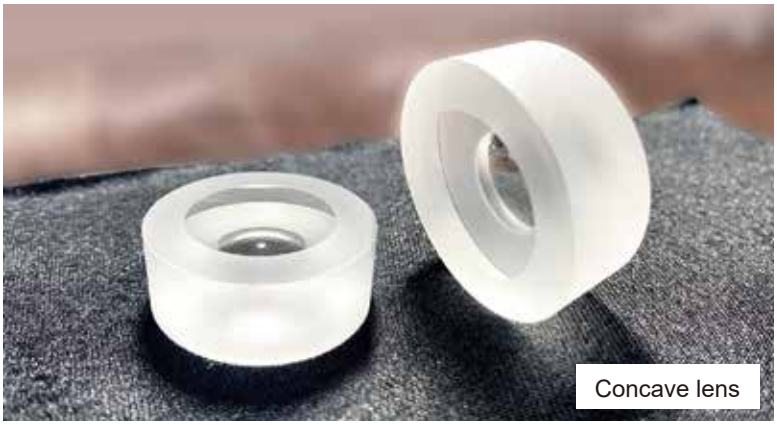

Edge-blackened lens

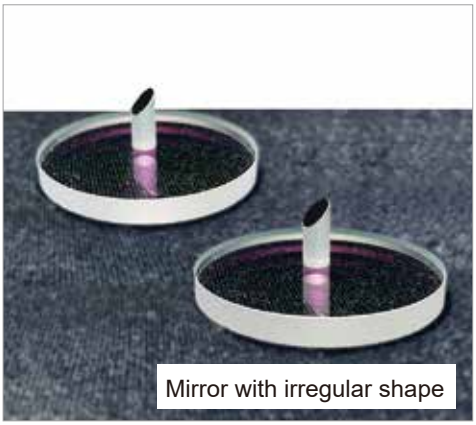

Prism

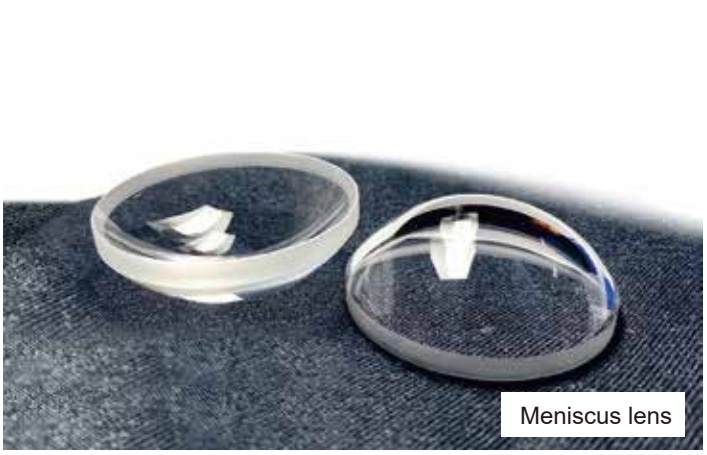

Cemented lens

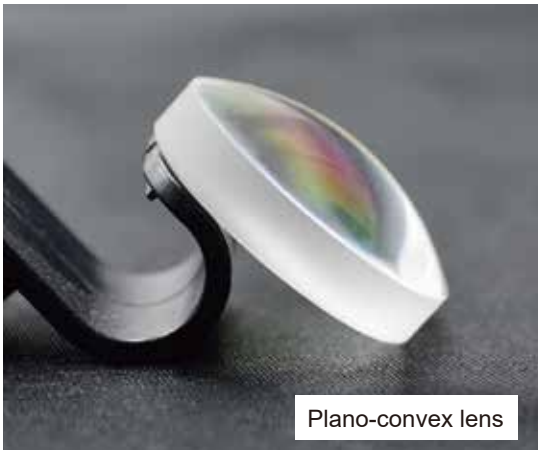

Convex lens

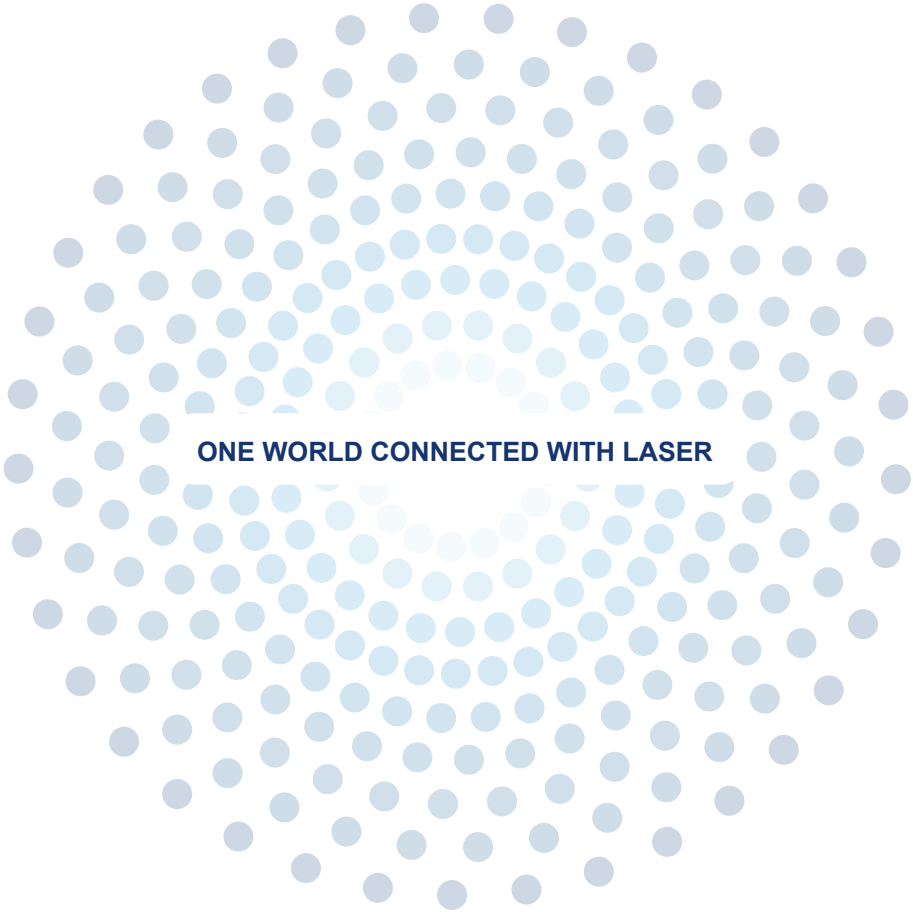

Cylindrical mirror


Concave lens


Mirror with irregular shape


Meniscus lens


Plano-convex lens



Brochure series:

Ultra-precision Optical Elements
Precision Optical Lens Assembly
Large-size Precision Optical Elements
Precision Optical Coating Solution
Collimators
Satellite Laser Communication System Solution

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Vehicle-Mounted Mobile Laser Communication Ground Station

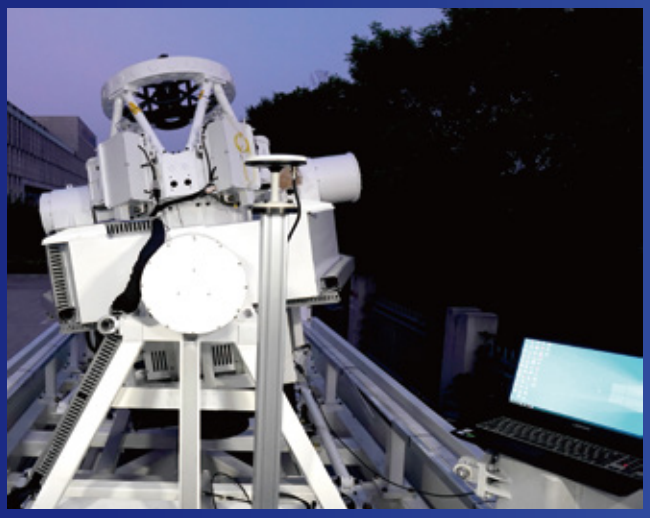
Next-Generation High-Speed Communication for Tactical and Emergency Applications

Product Overview:

The Vehicle-Mounted Mobile Laser Communication Ground Station is a cutting-edge solution at the forefront of satellite and emergency communications. Leveraging the inherent advantages of space-based laser communication—such as spectrum independence and zero electromagnetic interference—it is ideally suited for secure transmissions in radio-silent environments.

Designed for high-throughput performance, anti-jamming resilience, and mobile deployment, this system provides a robust, high-speed data link for battlefield scenarios and disaster response operations. In emergency rescue missions, the system demonstrates exceptional rapid-response capabilities, enabling the establishment of a fully operational communication network within minutes. This allows for real-time transmission of high-definition imagery and medical data from disaster zones.

Equipped with adaptive optics and high-sensitivity detectors, the system is capable of delivering reliable, 24/7, all-weather communication support in the field.



Product Features:

1.High-Precision Scanning

Features a horizontal rotary mount enabling seamless 360° coverage with zero blind zones. Ensures rapid link establishment and stable tracking in complex operational environments.

2.High-Speed Data Transmission

Supports OOK, PPM, and coherent modulation/demodulation schemes. Achieves data rates from 10 Mbps to 100 Gbps with bit error rates as low as 10^{-7}, meeting the demands of real-time, high-volume data transmission.

3.Multi-Band Compatibility

Integrated with stellar calibration functionality to correct optical axis deviations and enhance pointing accuracy across multiple bands.

4.Mobility and Flexible Deployment

Modular vehicle-mounted design allows for rapid deployment and site flexibility, ideal for dynamic field operations.

5.Superior Environmental Adaptability

Engineered to maintain communication stability in adverse weather conditions—including rain, snow, and cloud cover—significantly boosting operational efficiency and response effectiveness.

Technical parameters:

Communication Performance	Downlink Bidirectional Communication Rate	100Gbps
	Communication Bit Error Rate	1E-7 (post-decoding)
	Transmission Distance	2400km
Tracking System	Turntable Type	Horizontal structure
	Coverage	Full sky coverage with no blind spots (usable at zenith)
	Pointing Accuracy	Better than 5" (1σ) @ 20~135° pitch
	Tracking Accuracy	Better than 5 μrad (3σ)
	Acquisition Time	< 20 s
Optical System	Clear Aperture	300-500mm
	Beacon Laser	⩾20W@800nm/1550nm
	Signal Laser	⩾10W@1550nm
Environmental Adaptation	Operating lemperature	-30°C to +45°C
	Altitude	Normal operation at ⩽5000 m
	Vibration Resistance	Compliant with vehicle transport requirements

Application Scenarios:

The Vehicle-Mounted Mobile Laser Communication Ground Station excels in bandwidth, mobility, and anti-jamming, making it ideal for rapid deployment and high-throughput data transmission in critical environments.

Defense and Tactical Operations

- Quick deployment and maneuverability in dynamic battlefields
- Secure, high-speed data transmission in radio-silent zones

Emergency Communication and Disaster Response

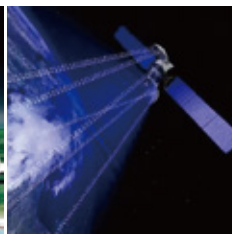
- Rapid setup of communication networks at disaster sites
- Fast transmission of real-time video, sensor, and medical data

Commercial Space Communication Services

- Data reception from satellite constellations
- Supports in-orbit telemetry, tracking, and command

High-Speed Satellite Data Downlink

- Surpasses traditional microwave link limitations
- Optimized for high-resolution Earth observation data reception



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High-Power Laser Beam Expansion System

Product Description:

The High-Power Laser Beam Expansion System, developed by Intane , significantly enhances the performance of laser beam expansion and transmission through adaptive wavefront control and a high-precision divergence angle closed-loop mechanism. This innovative system overcomes the limitations of distance and precision, ensuring optimal laser beam performance in diverse applications.

In the defense and security sector, the system effectively reduces beam divergence, maintaining high concentration of laser energy throughout transmission. In particular, its rapid response and high stability make it ideal for antidrone applications, meeting the stringent demands of specialized environments. In industrial processing, the system improves laser cutting and welding precision by meticulously controlling beam characteristics, thereby satisfying the exacting standards of precision manufacturing. Furthermore, in the field of space communications, the system compensates for beam distortion caused by atmospheric turbulence, ensuring reliable, highspeed data transmission between satellites and ground stations.

Product Features:

Higher Power Tolerance

- Key optical components are designed to withstand continuous laser power densities of up to 10,000 W/cm^2, with a coating reflectivity exceeding 99.5%, preventing thermal damage.
- Utilizes highdamage threshold materials and advanced anti-laser coating technologies, ensuring long-term, stable operation.

Intelligent Monitoring and Rapid Adjustment

- Features an integrated realime monitoring camera that dynamically tracks the laser spot position to maintain beam alignment accuracy.
- A fast steering mirror system enables quick deflection adjustments, ensuring rapid response in dynamic target tracking scenarios.

Excellent Environmental Adaptability

- The lens barrel is crafted from low thermal expansion invar steel, incorporating an active thermal management design to maintain optical system stability under extreme temperature conditions.
- Nitrogen-filled sealing, antimold, anti-salt spray treatment, and vibration-resistant design enhance adaptability to challenging environments, including field and vehicle operations.

Technical Specifications：

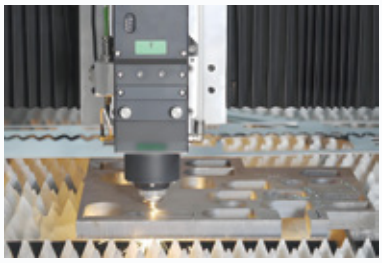
Parameter	
System Weight	⩽90kg
Dimensions	670mmx476mmx670mm
Structure Type	Off-axis Aspheric structure
Clear Aperture	Primary mirror: Φ290mm, Secondary mirror ϕ70mm
System Accuracy	RMS better than λ/12(λ=632.8 nm)
System Transmittance	>96 %
Beam Expansion Magnification	5 times ± 0.1
Laser Wavelength Range	1050~1100nm
Spot Diameter	50mm
Maximum Laser Power Density	10000w/cm^2
Temperature Range	-50°C~+70°C

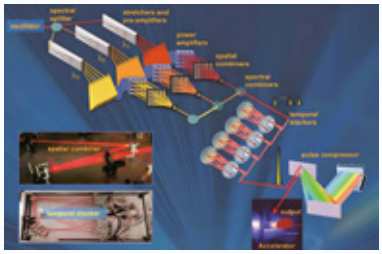
Typical Applications：

With high power tolerance, precise wavefront control, environmental adaptability, and rapid adjustment, this system offers significant value across industries such as manufacturing, defense, research, communications, and healthcare. It excels in scenarios requiring stable, reliable, high-quality laser performance.

Optical Countermeasures and Strikes

- **High-Power Laser Strike Systems:**
  Advanced beam control and target tracking for laser weapons.
- **High-Power Optoelectronic Countermeasures Systems:**
  Integration of destruction and interference capabilities, offering multi-spectral effectiveness and intelligent battlefield responses.
- **Optical Jamming and Protection:**
  Precision targeting and stable high-energy laser output for electronic warfare and anti-UAV systems.





Industrial Manufacturing

- **High-Precision Laser Processing:**
  Optimized for cutting and welding, with enhanced beam quality (M^2 <1.3) and micron-sized focus (20 μm). Enables stainless steel cutting speeds ⩾10 m/min and minimizes heat-affected zones (⩽50 μm).
- **Surface Treatment:**
  Conversion to flat-top beams for laser hardening and microstructure processing, increasing efficiency 5-8 times.
- **Precision Measurement and Detection:**
  Large-aperture beam expansion and wavefront correction for nanoscale surface detection.

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TorqueAxis™ Precision Rotary Mount

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High-Precision Two-Dimensional Rotary Mounts

Reliable Positioning Solutions for Optoelectronic Systems

Intane Optics offers a full range of high-precision two-dimensional rotary mounts, engineered for accurate pointing and control of optoelectronic devices. Our solutions cater to diverse applications, ensuring reliable performance in target acquisition, tracking, and stabilization across systems of various sizes—large, medium, and small.

Our rotary mounts are classified into three main categories

- **Ground-Based Rotary Mounts**
- **Airborne Rotary Mounts**
- **Space-Based Rotary Mounts**

Each category is designed to meet the exacting requirements of mission-critical applications, offering proven performance and adaptable configurations for diverse operational environments.

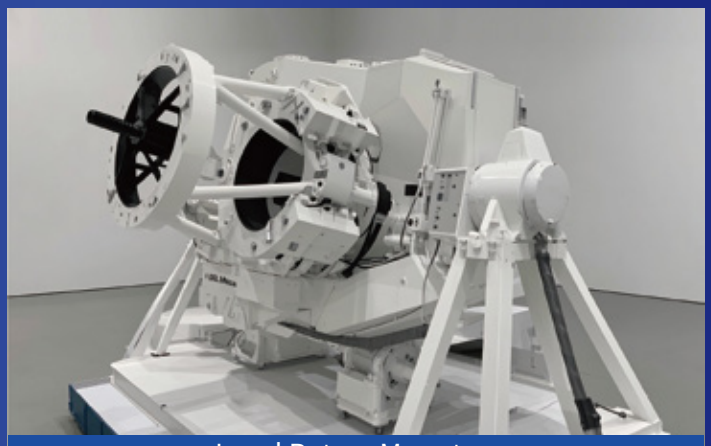
Ground-Based Rotary Mounts

Precision Support and Pointing Control for Optical Antennas

Intane Optics' Ground-Based Rotary Mounts provide exceptional structural support and precise pointing control for optical antennas with apertures ranging from 200mm to 1200mm. Available in Horizontal, Vertical, and Warp & Weft configurations, these mounts are tailored to meet specific operational demands.

Our rotary mounts can be customized to integrate a truss structure, minimizing wind resistance and thermal inhomogeneity, thereby enhancing both static and dynamic pointing accuracy. Designed for performance in demanding conditions, they offer reliable solutions for ground, airborne, and space-based applications.

Horizontal Rotary Mount



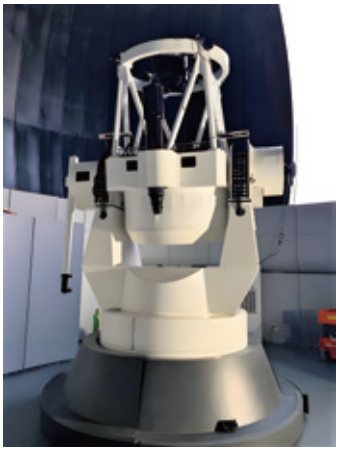
Level Rotary Mount

Key parameters:

Antenna Clear Aperture	200mm~1200mm	Positioning Accuracy	better than2″
Inclination Rotary Error	⩽10″	Pointing Accuracy	better than 4″
Perpendicularity of Two Axes	⩽10″	Tracking Accuracy	better than 10″
Degree of Intersection of Two Axes	⩽ ϕ0.5mm inside the ball	Tracking Angular Velocity	Azimuth axis: not less than 3°/s Elevation axis: not less than 1°/s
Pointing Range	Azimuth axis >±300°, Pitch axis -5°~180°		

Applications:

- Ground stations for laser communication in both fixed and vehicle-mounted configurations
- Large astronomical telescopes for advanced observation
- Large-scale radar systems
- High-power, large-aperture laser systems for intense applications



Space-Based Rotary Mounts

Precision Pointing Solutions for Spaceborne Applications

specifically designed for high-precision pointing and target capture in laser communication and other critical space applications.

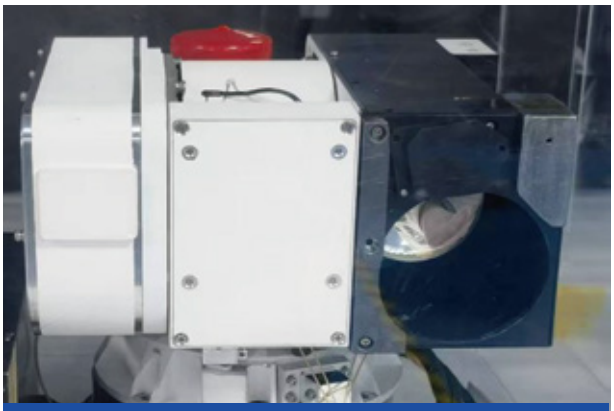
Engineered for operation in star-carrying environments, they support optical antennas with apertures from 30mm to 250mm.

Available in multiple configurations to suit diverse mission profiles:

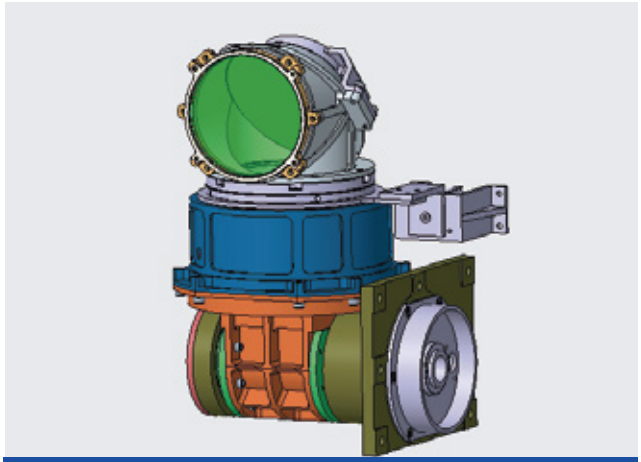
- **T-Type Rotary Mount**
- **U-Type Rotary Mount**
- **L-Type Rotary Mount**
- **Periscope-Type Rotary Mount**
- **Single Pendulum Mirror-Type Rotary Mount**

These mounts are built to meet a range of complex pointing requirements, including orbital plane pointing, inter-orbital tracking, and star tracking, ensuring reliable performance across satellite communications and space exploration missions.

U-Rotary Mount



T-Rotary Mount



Periscope Rotary Mount

Single Pendulum Mirror-Type Rotary Mount

Key parameters:

Antenna Clear Aperture	30mm~250mm	Positioning Accuracy	Better than 1″
Perpendicularity of Two Axes	⩽8″	Pointing Accuracy	Better than 4″
Pointing Range	Azimuth axis > ±150°, Pitch axis ±45	Tracking Accuracy	Better than 8″
Tracking Angular Velocity	not less than 0.5°/s in Azimuth Axis and not less than 0.15°/s in Pitch Axis		

Application:

- Interstellar laser communication within the same orbital plane
- Star-Earth Laser Communications (SELC)
- Interplanetary laser communications for deep-space exploration

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BQ-Analyzer™ (Beam Quality Analyzer)

The Intane Optics BQ-Analyzer™ (Beam Quality Analyzer) is a versatile diagnostic solution designed for the precise evaluation and optimization of all types of laser systems. Engineered for high-precision applications across research, industrial, and defense sectors, this instrument provides accurate measurements of critical laser parameters, including beam diameter, beam quality (M^2), optical axis jitter, and drift.

Its robust and adapmount design accommodates a broad spectral range—from ultraviolet (UV) to far-infrared (FIR)—and supports both continuous-wave and pulsed laser sources.

Key Features:

- **Flexible Integration:** Easily positioned anywhere along the optical path; compatible with both collimated and divergent beams.
- **Broad Compatibility:** Supports all laser types, including CW and pulsed lasers, across UV to FIR wavelengths.
- **Environmental Stability:** Delivers consistent performance even under vibration or in challenging operational environments.

System Specifications:

Parameter	Specification
Overall System Dimensions	1342 mm *561 mm* 357.5 mm (L *W *H), height adjustment ±10 mm
Clear Aperture	ϕ160mm
Combined Beam Reducer Aberration	PV≤λ/4@633nm、RMS≤λ/20@633nm
Optical Axis Height	200 mm ±10 mm adjustment
Applicable Wavelength Range	340nm~1100nm
Target Surface Resolution	2048*2048 pixels
Spatial Resolution	5.5μm*5.5μm

Typical Applications:

Laser beam quality measurement instruments are essential tools in both the advancement of laser technologies and a wide range of industrial applications. Key areas of use include:

- **High-Power Laser Diagnostics:**

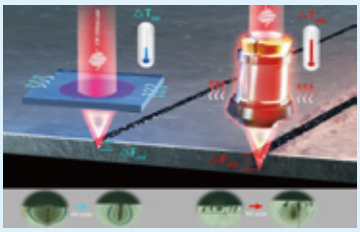
  Employed for monitoring thermal lensing effects in industrial and defense-related high-energy laser systems, as well as evaluating beam quality under complex external field conditions.

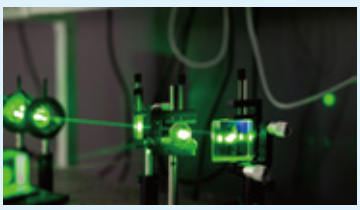
- **Laser Beam Characterization and Optimization:**

  Used primarily to assess and enhance laser performance through the measurement of parameters such as spot size, beam divergence, M^2 factor, and wavefront aberrations. These measurements support the design and refinement of resonant cavities to improve the efficiency and output quality of fiber and solid-state lasers.

- **Optical System Calibration and Testing:**

  Facilitates precise evaluation of optical components, including lenses and reflectors, by detecting aberrations and optimizing the alignment and focusing accuracy of optical paths in laser cutting, welding, and processing systems.





In addition to industrial and research uses, these instruments play a critical role in high-precision applications such as semiconductor lithography, biomedical imaging, and LIDAR systems—driving innovation and performance across cutting-edge laser technologies.

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Intane OPTICS® 英田光学

VectorX™ Far Field Detection System

Product Description:

The VectorX™ Far Field Detection System, developed by Intane Optics, is a sophisticated optoelectronic targeting and tracking solution specifically engineered for detecting non-cooperative targets. With its advanced optical design and intelligent control technology, the system delivers precise detection, rapid identification, dynamic response, and reliable tracking of non-cooperative targets, even in challenging electromagnetic environments. The VectorX™ system ensures highly dependable target guidance for countermeasure systems, enabling precise target locking and guidance for long-range engagements, high-speed maneuvers, or operations under strong interference conditions.

Product Features:

- **Multi-Mode Transceiver Capability:**

  The system features a laser beam multi-aperture parallel bias-preserving transceiver, enabling flexible beam transceiver configurations that adapt to a wide range of application scenarios.

- **Precision Tracking and Scanning:**

  Achieves micro-arc level pointing accuracy, significantly enhancing dynamic target tracking capabilities.

  The adaptive focus function adjusts to infinity working distance, ensuring clear, high-definition imaging of the target at various ranges.

- **Modular Design and Compatibility:**

  The VectorX™ supports two modes of operation (input/output) and is compatible with both single-mode and multi-mode optical fiber switching to meet diverse signal transmission requirements.

  Ample reserved mounting space allows for the seamless integration of external light sources or detectors, offering exceptional expandability for future upgrades.

- **Intelligent Control and Calibration**

  The system' s visible light monitoring camera integrates deep learning algorithms for automatic target identification and continuous tracking.

  A built-in self-calibration module ensures the transceiver's coaxiality remains within 1.5″, thereby ensuring long-term operational stability and high accuracy.

Technical parameters:

Optical Performance	Clear Aperture	⩾ϕ350mm
	System Wave Aberration	Better than λ/15@RMS1064nm
	Angular Resolution	⩽3.7μrad@1064nm
	Transmittance	⩾82%
	Working Wavelength	600-1800nm
Tracking Performance	Turnmount Tracking Accuracy	⩽25μrad
	Minimum Deflection Accuracy of the Emitted Beam	⩽0.14μrad
	Fast Mirror tracking Bandwidth	800~1000Hz
Scope of work	Emission Beam Scanning Range	⩾±1mrad
	Azimuth Rotation Range	0°-360°
	Pitch Rotation Range	0°-90°
	Precision Tracking Camera Sensitivity	⩽-74dBm@1550nm

Typical Applications:

- **Drone Surveillance and Countermeasures**

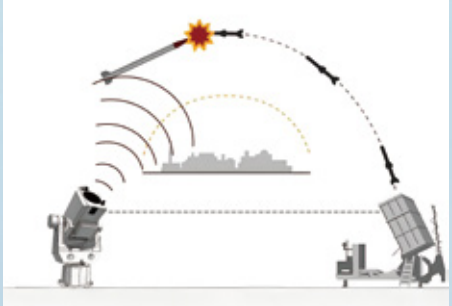
  Enables long-range, high-precision identification and tracking of drone targets. Ideal for protecting critical infrastructure and sensitive areas, as well as intercepting small unmanned aerial vehicles (UAVs).

- **Laser Communication and Remote Sensing**

  Supports multi-mode laser transceivers to facilitate high-speed data transmission and high-resolution remote sensing, meeting the demands of modern communication and environmental monitoring systems.

- **Strategic Air Defense**

  Delivers highly reliable target detection and tracking capabilities for early warning, tactical reconnaissance, and precision guidance—essential for the effectiveness of advanced air defense operations.



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