



**Ultra-Precision
Optical Component
Manufacturer**



CATALOG

01

About BENA OPTICS: End-to-End Capabilities
Rooted in Changchun Optical Industry Cluster

02

Product Offerings: Customized Solutions Spanning
All Optical Component Categories

03

Core Manufacturing Processes: Best-in-Class
Equipment Delivering Nanometer-Level Precision

04

Quality Assurance: Strict Control System Trusted
by Global Customers



01

About BENA OPTICS

**End-to-End Capabilities Rooted in
Changchun Optical Industry Cluster**

Company Position:

Specialized and High-Tech Enterprise in Changchun Optical Industrial Base

Technology First

2014

Founded in Changchun High-Tech Zone

2million

Registered Capital (RMB)

2500m²

Manufacturing Space

Professional Team

-  About **30 professionals** in total
-  Technical engineers with R&D expertise
-  Processing & assembly/testing specialists

Core Qualifications

 **ISO9001:2015**
Cert. No. 02021Q0713R0S

 **"Little Giant" Enterprise**
Cert. No. 202201279 · Nov 2022



02

**Product Offerings:
Customized Solutions Spanning All
Optical Component Categories**

Spherical Lenses: Full Type and Specification Supply

Product Type

Plano-convex, plano-concave, biconvex, biconcave, meniscus, etc.

Specification Range

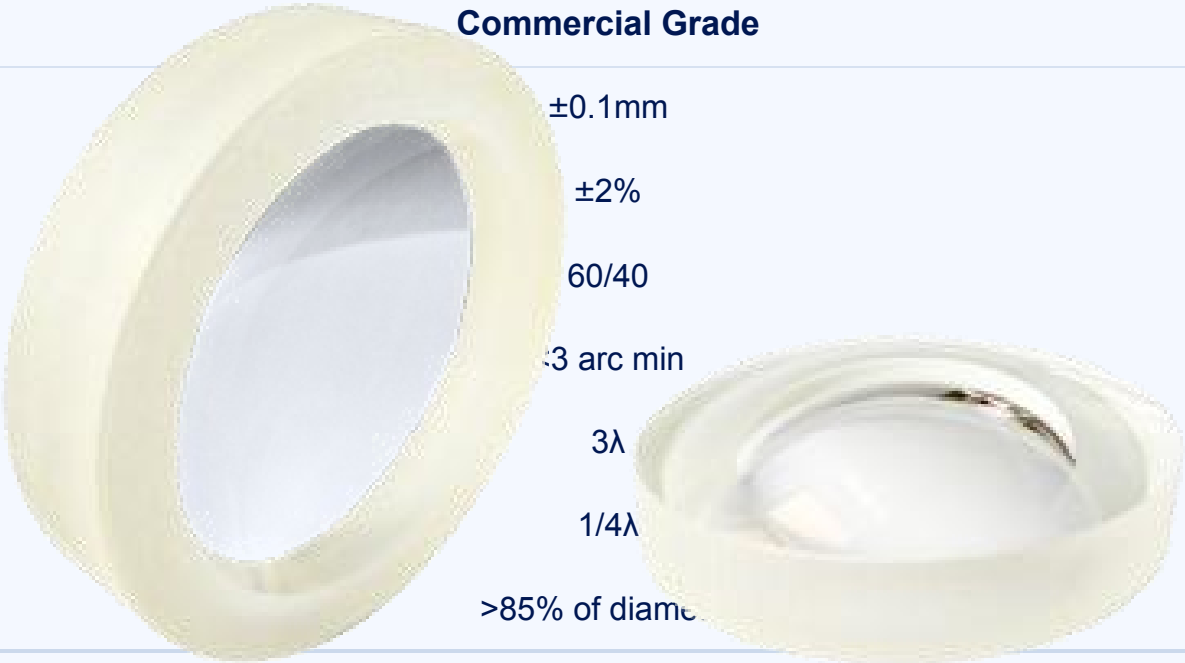
Diameter $\varnothing$ 5mm ~ $\varnothing$ 600mm

Material Options

UV quartz, fused silica, visible light glass (Schott, CDGM, HOYA, etc.)

Accuracy Grade Comparison

Parameter	Commercial Grade	High-precision Grade
Diameter Tolerance	$\pm 0.1\text{mm}$	$\pm 0.05\text{mm}$
Focal Length Tolerance	$\pm 2\%$	$\pm 1\%$
Surface Quality	60/40	40/20
Centration Deviation	$\leq 3\text{ arc min}$	$< 1\text{ arc min}$
Surface Figure	3λ	2λ
Surface Irregularity	$1/4\lambda$	$1/10\lambda$
Effective Aperture	$> 85\%$ of diameter	$> 90\%$ of diameter



Aspheric Lenses:

Nanometer-level Precision for Aberration Correction

Nanometer-level Precision

Continuous curvature radius change from center to edge, effectively correcting spherical aberration and chromatic aberration for improved spot quality

Custom Capabilities

-  Diameter Range
10~800 mm
-  Diameter Tolerance
0/-0.015 mm
-  Surface Quality
20/10 or **10/5**
-  Surface Figure Accuracy
RMS≤λ/80 @632.8nm
-  Surface Roughness
Ra≤2 nm

Application Scenarios

-  **Optical Instruments**
Telescopes, microscopes, measuring instruments
-  **Laser Systems**
Beam shaping, image transmission, laser marking
-  **Automotive Optics**
Car lights, vehicle-mounted cameras
-  **Medical Ophthalmology**
Glasses, contact lenses

Special Optical Components:

Cylindrical Lenses and Optical Domes



Cylindrical Lenses

Function

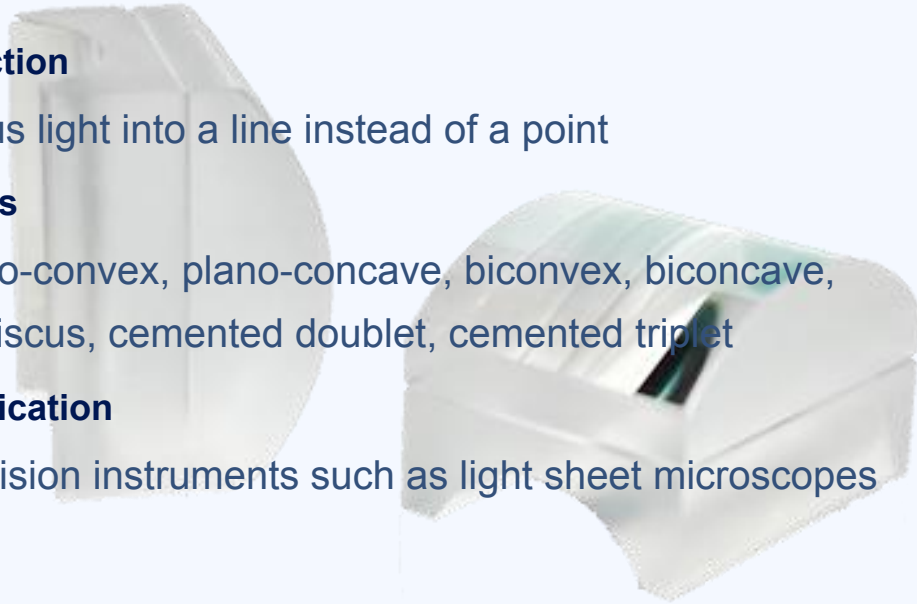
Focus light into a line instead of a point

Types

Plano-convex, plano-concave, biconvex, biconcave, meniscus, cemented doublet, cemented triplet

Application

Precision instruments such as light sheet microscopes



Optical Domes

Structure

Composed of hemisphere and hyper-hemisphere, parallelism controlled within $\pm 2\mu\text{m}$

Categories

Solar radiation domes, underwater and deep-sea imaging domes, sky camera domes, national defense application domes

Diameter Range

Ø5mm ~ Ø350mm

Feature

Ensure distortion-free imaging



Prisms and Optical Windows: Multiple Materials and Specifications Available



Prisms

Function

Disperse, deflect, reflect and rotate light beams

Size Range

Ø5mm ~ Ø650mm

Material Types

UV glass, visible light glass, infrared materials (sapphire, ZnSe, silicon, etc.), special materials



Optical Windows

Function

Isolate internal and external environment without changing optical magnification

Material Options

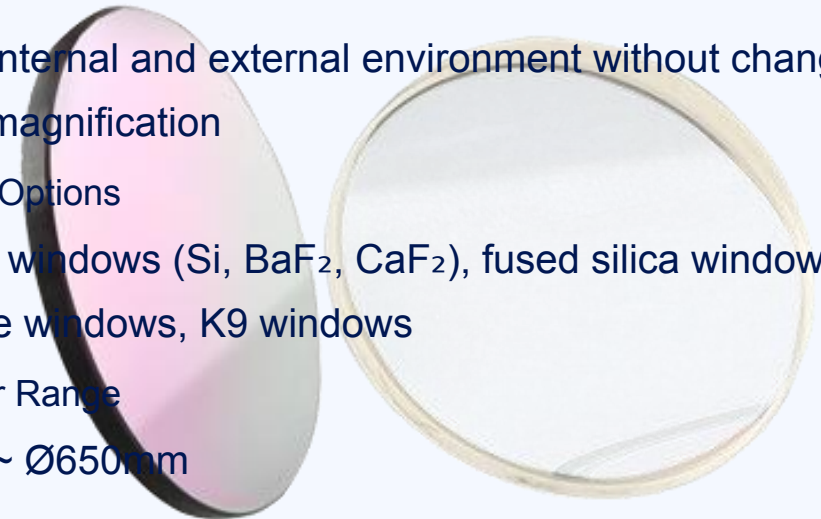
Infrared windows (Si, BaF₂, CaF₂), fused silica windows, sapphire windows, K9 windows

Diameter Range

Ø5mm ~ Ø650mm

Surface Figure Accuracy

1/4λ (commercial grade) or 1/10λ (high-precision grade)



Mirrors and Filters: Full Spectrum Coverage

Mirrors

- **Metal mirrors:** Vacuum evaporated metal film coated with SiO or MgF₂ protective layer
- **Dielectric mirrors:** Reflectivity related to incident angle, typical angle range for AOI=45° is 45°±3°

Filter Types

Band pass filter Short pass filter Long pass filter
Neutral density filter Notch filter IR cut filter
IPL filter/IPL crystal Color glass filter Birefringent filter

Filter Type Specifications

 Band pass filter

 Short pass filter

 Long pass filter

 Neutral density filter

 Notch filter

 IR cut filter

 IPL filter/IPL crystal

 Color glass filter

 Birefringent filter

Customized Services:

Build-to-Print with No Minimum Order Quantity



Service Model

Build-to-print customization

**No Minimum Order
Quantity**



Mfg Range & Accuracy

$\Phi 1 \sim 600\text{mm}$

Manufacturing Range

$\lambda/100@632.8\text{nm}$

Surface Accuracy



Material & Coating

- **Multiple material types** available for diverse application needs
- **Standard and customized coatings** covering full spectrum

03

**Core Manufacturing Processes:
Best-in-Class Equipment Delivering
Nanometer-Level Precision**



Ring Polishing Machine & CNC:

High-precision Processing for Large Aperture



Ring Polishing Machine

- **Processing Features**

High precision and outstanding efficiency

- **Processing Range**

Large aperture components (**$\Phi 400\sim 2000\text{mm}$**)

- **Surface Figure Accuracy**

$1/20\lambda$ precision standard

- **Application Fields**

Major national projects in **national defense and aerospace industries**



CNC

- **Function**

Precisely control the position of polishing tools and workpieces

- **Advantage**

Ensure each polishing step achieves **expected accuracy**

- **Key Role**

Critical for the **surface quality and shape accuracy** of optical components

Ion Beam Finishing (IBF): Non-contact Nanoscale Processing

Based on CCOS principle, removes material via sputtering effect between ion beam and components



Non-contact processing

Avoids potential damage caused by mechanical tool contact



Aspheric processing

Especially suitable for aspheric surface processing



Extreme stability & precision

Provides extremely high stability and precision



Prevents sub-surface damage

Eliminates sub-surface damage risks



Stable ion source technology

Advanced ion source with long-term operational stability



Precision numerical control

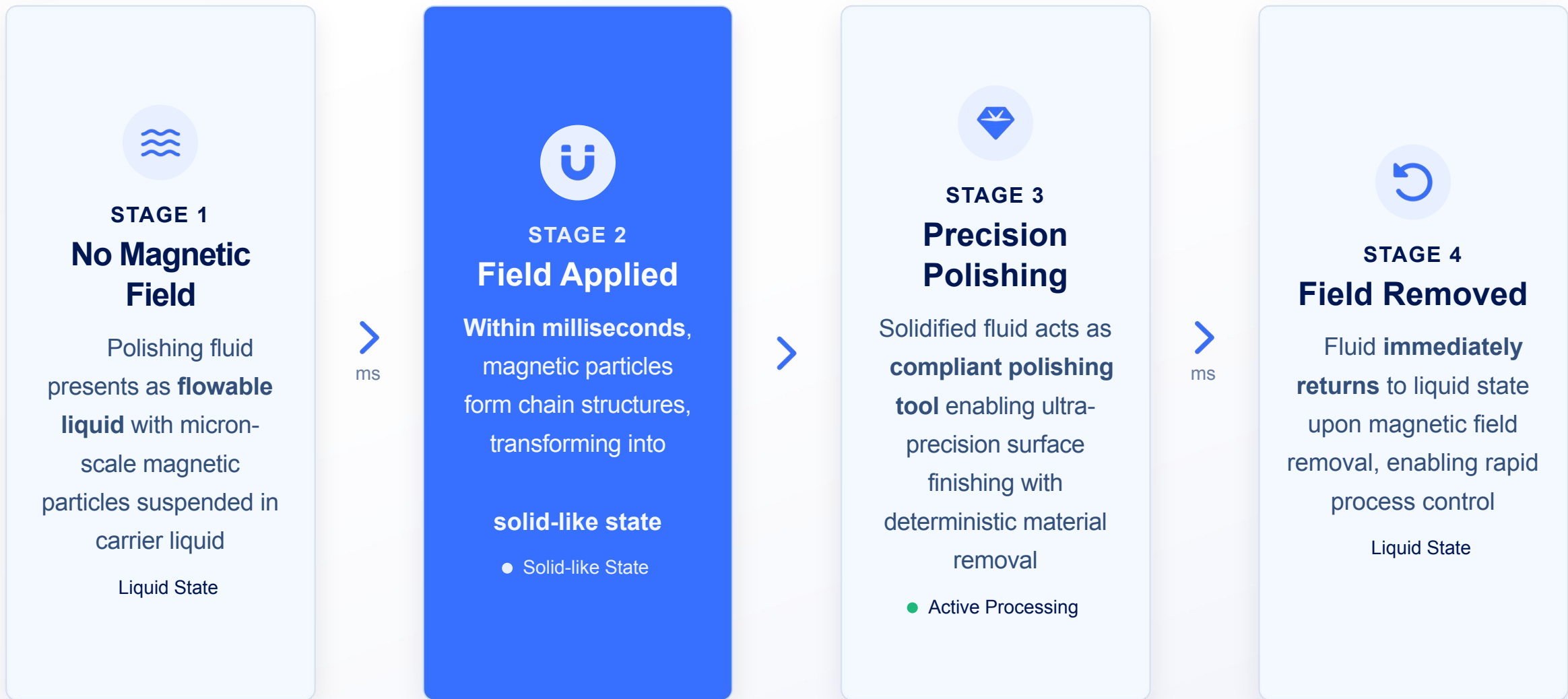
Precision numerical control technology for accurate beam positioning



High precision & convergence

High precision and high convergence beam characteristics

Magnetorheological Finishing (MRF): Millisecond-level Rheology Control



CCOS and High-precision Coating: Full Process Digital Control

CCOS

Computer Controlled Optical Surfacing

Control Factors:

- Grinding head movement path
- Relative pressure
- Dwell time

Core Advantages:

- Higher polishing efficiency than traditional processes
- Better surface figure accuracy indicators

High-precision Coating

Applicable Coatings:

Anti-reflection coatings, band-pass coatings, cut-off coatings and other types

Core Configurations:

- High-precision film thickness control system
- High-performance electron gun
- Highly automated coating control system

Process Capability

100% Digital Process

Full process digital control for aspheric products

RoHS

REACH

Compliant with international environmental regulations

04

**Quality Assurance:
Strict Control System Trusted by
Global Customers**



Quality Management System: ISO9001:2015 Certified



ISO9001:2015

Quality Management System

Valid until April 1, 2024

Certification Scope

-  R&D, production and related technical services of optical components
-  R&D, production and related technical services of optical lenses
-  R&D, production and related technical services of collimators



Certified
2021



Valid Until
Apr 1, 2024

Testing Equipment: Sub-nanometer Precision Measurement



Zygo Laser Interferometer

Function

Sub-nanometer level surface measurement and wavefront analysis

Advantage

Quickly identify and correct tiny manufacturing defects, continuously optimize production process



CMM

Coordinate Measuring Machine

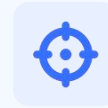
Core Equipment

Features

Ultra-high speed and high precision dynamic performance

Applications

- High-precision geometric measurement
- Surface quality assessment
- Complex curved surface measurement
- Automated efficient inspection



Centering Instrument

Function

Provide unparalleled centering accuracy

Effect

Ensure perfect alignment of each lens and optical component, minimize aberration

High-precision Profilometer: Multi-wavelength Interferometry Technology

420_{HD}

LuphoScan420HD

MWLI

Multi-wavelength Interferometry

600_{mm}

Max Measurable Diameter

Measurable Parameters

-  True morphology
-  Thickness
-  Wedge and centering errors
-  Segmented surfaces

Special Capability

-  Rectangular components
-  Annular lenses
-  Surfaces with diffraction steps

Measurable Diameter Range

120
mm

260
mm

420
mm

600
mm

Testing Capability Parameters: Full Specification Coverage

■ Planar Component Testing

MAXIMUM DIAMETER

600mm

SURFACE ACCURACY

RMS $\lambda/80$ @632.8nm@600mm

○ Spherical/Aspheric Testing

CONCAVE SURFACE MAX

800mm

CONVEX SURFACE MAX

500mm

SURFACE ACCURACY

RMS $\lambda/80$ @632.8nm@500-800mm

VS

Global Customers: Trusted and Verified by Customers in 60+ Countries

60+

Countries Worldwide

Products are sold to more than 60 countries worldwide, establishing a truly global presence across every continent



Application Fields

- Scientific Research
- Medical Instruments
- Aerospace
- National Defense Equipment
- Meteorological Monitoring
- Geological Exploration
- Petroleum Exploration

Well-known Customer Cases

-  **Changchun Institute of Optics, Fine Mechanics and Physics**
Chinese Academy of Sciences (CIOPMA) China
-  **Beijing Institute of Technology**
BIT China
-  **Stanford University**
USA USA

5 Reasons to Choose BENA OPTICS



Advanced Technology

Equipped with cutting-edge equipment including Zygo laser interferometer and centering instrument to ensure the highest level of accuracy and reliability



Strict Quality Control

Rigorous quality management system ensures every optical component meets the most stringent industry standards



Professional Experience & Innovation

With years of experience in the optical industry, our team is committed to continuous improvement and innovation to maintain technological leadership



Customer Orientation

Prioritize customer needs, provide customized solutions and excellent support



Competitive Advantage

Our commitment to excellence and precision provides customers with competitive advantages in scientific research, manufacturing and other fields



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