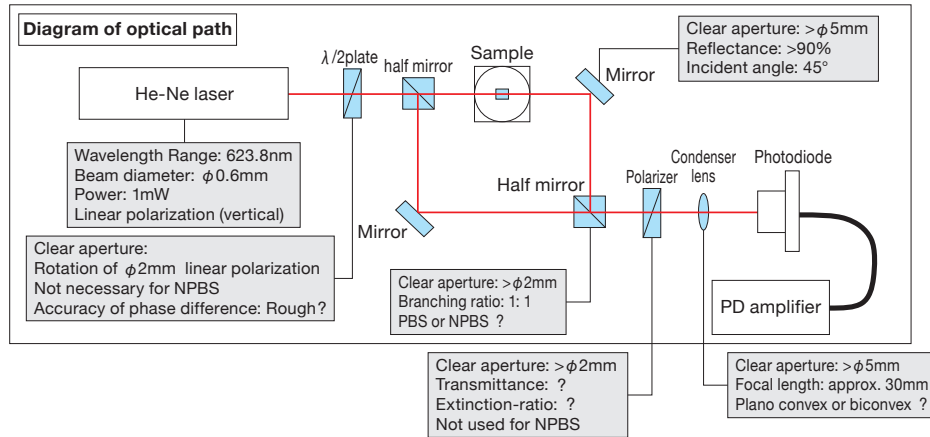


Optics & Optical Coatings Guide

Selection of Optics

Prepare a diagram featuring your desired optical path based on your experimental principles for the optical system. Check the required specifications of each optical component stated on the optical path and select the correct components. As the options available are extensive, we can assist you by introducing the following two important factors when selecting your optics. (Laser Specifications & Classification of Optical Systems)



Laser Specifications

When selecting optics, determine the type of "light" to be used. As there are various types of light sources in the market, our Sigma Koki catalog offers Laser, LED, Halogen and Metal Halide solutions. Laser typically offers various wavelengths and the accompanied optics to be used can differ depending on the wavelengths. In addition to the wavelength of laser, there are some elements to consider when deciding the specification of optics.

Check Items for Laser	Example 1	Example 2	Related Spec
Laser Type	He-Ne	YAG	Compatible Wavelength
Wavelength [nm]	632.8nm	532nm	
Calculation of Energy Density [J/cm ²] (User should calculate)	Any	78J/cm ²	Not applicable for CW of laser damage threshold of 0.5W or lower Not applicable for pulse of 100mJ/cm ² or lower
Output beam diameter (1/e ² , diameter) [mm]	0.59mm	0.7mm	
For continuous wave (CW) laser Output [W]	1mW	—	
For pulse laser Energy [J], Pulse width [s], Repetition frequency [Hz]	—	300mJ 10ns, 20Hz	
Beam Spread Angle (Full) [rad]	1.35mrad	1.3mrad	Clear aperture
Transverse Mode	TEM ₀₀	Single	Focus spot diameter
Polarization Orientation (Vertical, horizontal, or random)	Vertical	Horizontal	Reflectance, transmittance

If the information provided above is still uncertain, please check with the manufacturer of the Laser and they will provide you with the necessary information and specifications.

Compare the specifications of the optics listed in our catalog against the laser and select the optics that is compatible especially in the area of laser damage threshold and polarization orientation.

Classification of Optical System

Confirm the type and degree of precision required for your optical system. If uncertain, you may classify by its intended usage. Illumination by itself does not require precision but more towards functionality and purpose. Please see chart below to have a better understanding.

Class	Surface Accuracy	Surface Quality	Product Example	Usage
Illumination System Class	About λ	About 60–40	Biconvex lens Aspheric lens	Lamp illumination of microscope Condensing beam to a detector, etc.
Simplified Optical System Class	$\lambda/4$ or lower	40–20 or lower	Plano convex lens Achromatic lens Aluminum* / Dielectric multi-layer mirror coating	Various imaging systems Interferometers for small diameter beam
Interferometer Class	$\lambda/10$ or lower	20–10 or lower	Surface accuracy guaranteed mirror Femto high power mirror Focusing lens	Interferometers for wavefront observation, laser processing devices Optical experiments with higher resolution

The above classification is a rough guide. The classification may not apply depending on products or materials.

For selection of each product, refer to the selection guide. Also refer to the explanations in the selection guides or application notes such as "Beam Expanding Method" or "How to Use Polarizers".

If you have any question, contact our International Sales Division.

When making an inquiry, do let us know your laser specifications or intended usage, we can provide you with a quicker and more comprehensive answer or solution.