Click here to visit the Pinholes page with pricing and availability information on Thorlabs.com

THORLABS

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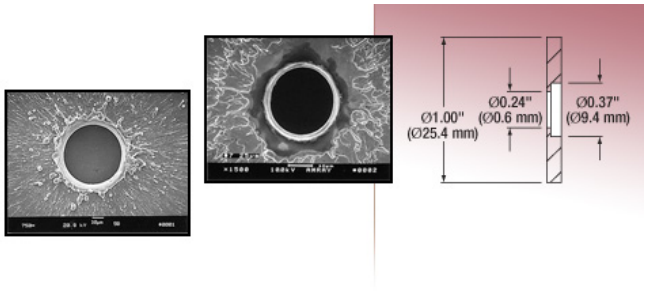
Pinholes

- Ideal for Building Spatial Filters
- Standard and High-Power Pinholes
- Mounted in Ø1" Disks



Overview

For many applications, such as holography, spatial intensity variations in the laser beam are unacceptable. Using these precision pinholes in conjuction with precision positioning and focusing equipment such as our KT310 Spatial Filter System creates a "noise" filter, effectively stripping variations in intensity out of a Gaussian beam. Please see the *Tutorial* tab for more information on spatial filters.

Tutorial

Principles of Spatial Filters

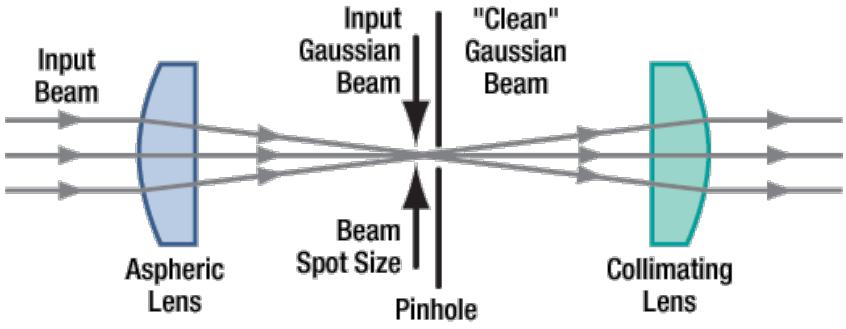


Figure 1 - Spatial Filter System

The input Gaussian beam has added to it spatially varying intensity "noise." When a beam is focused by an aspheric lens, the input beam is transformed into a central Gaussian spot (on the optical axis) and side fringes, which represent the unwanted "noise" (see *Figure 2* below). The radial position of the side fringes is proportional to the spatial frequency of the "noise".

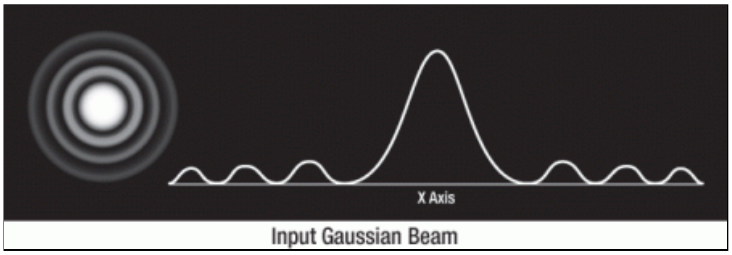


Figure 2

By centering a pinhole on a central Gaussian spot, the "clean" portion of the beam can pass while the "noise" fringes are blocked (see *Figure 3* below).

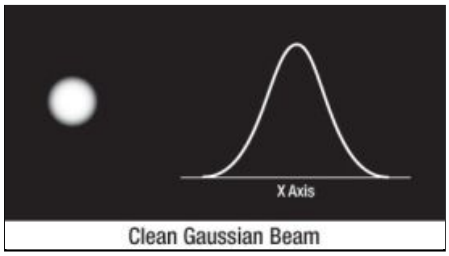


Figure 3

The diffraction-limited spot size at the 99% contour is given by:

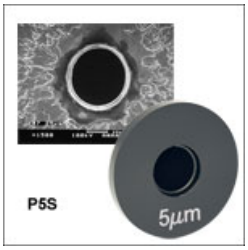
$$D = \frac{\lambda f}{r}$$

where λ = wavelength, f=focal length and r = input beam $1/e^2$ radius.

A pinhole that is approximately 30% larger than the diffraction-limited spot size should be chosen to allow the focused Gaussian spot to pass while blocking the "noise" fringes that are shifted off axis. If the pinhole is too small, the beam will be clipped, but if it is too large, additional noise will get through the pinhole.

For more information on creating a spatial filter system for your application, please see the *Tutorial* tab on the Spatial Filters Systems page.

Mounted Pinholes



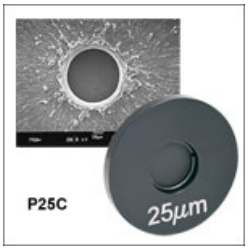
- Pinhole Fabricated from 302 Nonmagnetic Stainless Steel
- 12.5 µm Thickness at Aperture
- Aluminum Housing with 1" Outer Diameter

Pinhole Diameters	Diameter Tolerance	Pinhole Thickness
5 and 10 µm	1 µm	12.5 µm
15 µm	1.5 µm	
20, 25, 30, and 50 µm	2.0 µm	
75 µm	3.0 µm	
100 µm	4.0 µm	
150 µm	6.0 µm	

Order

PartNumber	Description	Price	Availability
P5S	Ø5 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 60,10	Today
P10S	Ø10 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 52,70	Today
P15S	Ø15 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 52,70	Today
P20S	Ø20 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 52,70	Today
P25S	Ø25 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 52,70	Today
P30S	Ø30 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 52,70	Today
P50S	Ø50 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 52,70	Today
P75S	Ø75 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 52,70	Today
P100S	Ø100 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 52,30	Today
P150S	Ø150 µm Mounted Pinhole, Ideal For Building Spatial Filters	€ 52,70	Today

High Power Mounted Pinholes



- Copper Pinholes, Gold-Plated One Side, Flat Poly Black (98% Emissivity on the Reverse)
- 25 µm Thickness at Aperture
- Aluminum Housing with 1" Outer Diameter

Damage Threshold

- 5 x 10^5 W/mm^2, 75 ns Pulse @700 nm
- 1 x 10^6 W/mm^2, 10 ns Pulse @ 700 nm
- 1 x 10^4 W/mm^2, CW @ 10.6 µm

Gold-Plated Side of P25C

These high-power pinholes are designed to withstand high power densities, up to 10^4 W/mm^2

Pinhole Diameters	Diameter Tolerance	Pinhole Thickness

(10^6 W/cm^2) for CW lasers. We recommend aligning the pinhole at low power, increasing the laser to full power after ensuring good throughput.

Pinhole Diameters	Diameter Tolerance	Pinhole Thickness
10 µm	1 µm	25 µm
25 µm	2.0 µm	
50 µm	3.0 µm	

Order

PartNumber	Description	Price	Availability
P10C	Ø10 µm High-Power Pinhole	€ 85,00	Today
P25C	Ø25 µm High-Power Pinhole	€ 85,00	Today
P50C	Ø50 µm High-Power Pinhole	€ 85,00	Today