

User's Guide

Absorptive Neutral Density Filters

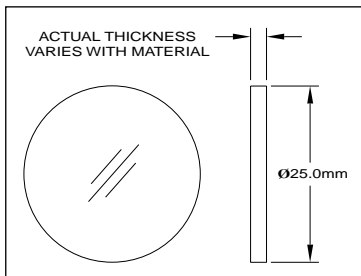
THORLABS INC

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Absorptive neutral density filters (unlike metallic filters) are manufactured using ionically colored glass that may be polished to various thicknesses to control the optical density. The neutral density filters produced by Thorlabs, Inc. are made using three different Schott glasses (NG4, NG9 and NG11) providing a range of filters from 0.1 to 5.0 optical densities.

UNMOUNTED FILTER



The neutral density glasses have been constructed to have a very constant transmission over a large spectral range, especially in the visible. All of our filters are designed using the melt data for the particular lot of filter glass at 546nm. The optical density is determined by accounting for absorption within the material and reflections on the polished surfaces. The relationship between optical density D and transmission T is given below:

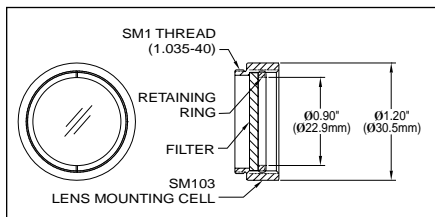
$$D = \log_{10}(1/T) \quad \text{or} \quad T = 10^{-D}$$

Optical density D is additive so the effect of multiple stacked filters may be calculated easily. Mounted filters screw together increasing the ability to achieve a desired optical density.

Thorlabs offers the filters in both unmounted and mounted forms as well as in kits. The mounted version is held in an SM1 series mounting cell.

This allows for easy of use with other Thorlabs parts using SM1 thread.

MOUNTED FILTER



Density D	Transmission T
0.1	79%
0.2	63%
0.3	50%
0.4	40%
0.5	32%
0.6	25%
1.0	10%
1.3	5.0%
2.0	1.0%
3.0	0.1%
4.0	0.01%
5.0	0.001%

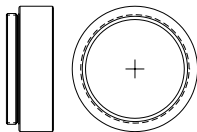
Accessories

SM1 Series Lens Tubes

SM1L03

Lens/Filter

Mounting Cell

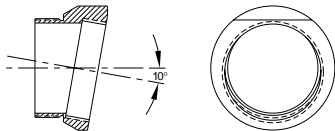


SM1 Series Angled Optic Mount

SM1L03T

Angled Filter

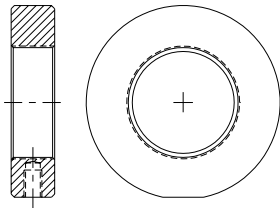
Holder to Reduce
Back-Reflections



SM1 Series Mounting Ring

SMR1

Mounting rings allow lens tube assemblies to be mounted to post and post holders. The ring has SM1 thread to accept the Lens Tube and a #8-32 threaded hole for post mounting. Add/M for metric M4 version.



Accessories

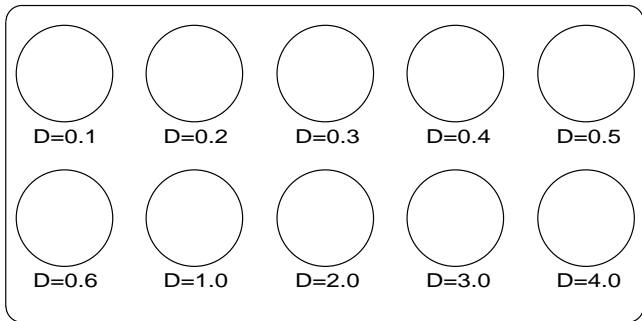
Neutral Density Filter Kits

NEK01

Complete set of 10 Mounted Absorptive ND filters in labeled storage box

Includes:

D=0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 1.0, 2.0, 3.0 and 4.0



NDK01

Complete set of 10 Mounted Metallic Reflective ND filters in labeled storage box

Includes:

D=0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 1.0, 2.0, 3.0 and 4.0

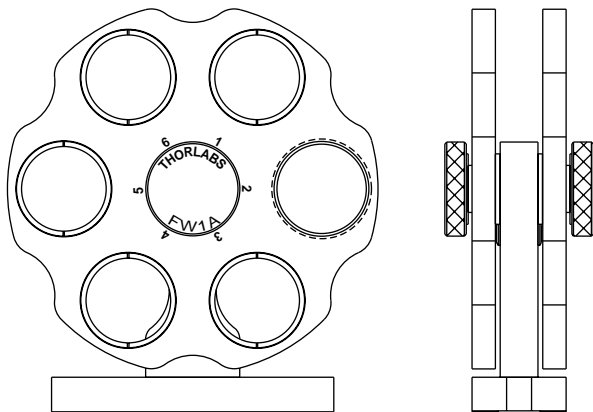
Accessories

Neutral Density Filter Wheels

FW1AND

Single Wheel with 5 ND Filters

$D=0.5, 1.0, 2.0, 3.0$ and 4.0



FW2AND

Dual Wheel with 10 ND Filters

$D=0.2, 0.3, 0.4, 0.5, 0.6, 1.0, 2.0, 3.0$ and (2) 4.0

See

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