



## 3.5 Accessories for Beam Profiling

### Introduction

Spiricon has the most extensive array of accessories for beam profiling existing. There are components for attenuating, filtering, beam splitting, magnifying, reducing and wavelength conversion. There are components for wavelengths from the deep UV to CO<sub>2</sub> wavelengths. Most of the components are modular so they can be mixed and matched with each other to solve almost any beam profiling requirement needed.

### 3.5.1 Neutral Density Attenuators/Filters

For almost all applications, the laser beam intensity is too high for the operating range of the CCD. Therefore ND glass attenuator filters are available to reduce the intensity to the proper level at the CCD. These filters are carefully designed not to affect beam quality or cause interference effects. One stackable ND1 filter and 2 ND2 filters are supplied standard with each c-mount camera.



Model	Stackable ND Filters ND1 / ND2 / ND3	ATP-K Variable Attenuator	UV ND Filters	Specialty Filter for 355nm
Nominal ND value	1, 2, 3	ND=1.7-4.6 Max. ND: 7.4 (with fixed 2.8 gray-glass attenuator)	0.3, 0.7, 1.0, 1.3, 1.7, 2.0, 2.3, 2.7, 3.0, 3.3, 3.7, 4.0, 4.3, 4.7, 5.0, 6.0	Pass 355nm, blocks 532nm & 1064nm
Clear aperture	Ø19mm	Ø15mm	Ø20mm	Ø19mm
Damage threshold	~50W/cm <sup>2</sup> / 1J/cm <sup>2</sup> for ns pulses no distortion	100mW/mm no thermal lensing	100W/cm <sup>2</sup> CW, 10ns pulses, no distortion	5W/cm <sup>2</sup> no distortion
Mounting	C-Mount Threads	C-Mount Threads	C-Mount Threads	C-Mount Threads

### Stackable ND filters

The individual filters come in three versions, the ND1 filter in the red housing with ~10% transmission in the visible, the ND2 filter in the black housing with ~1% transmission and the ND3 filter in the green housing with ~0.1% transmission. The individual filters can be screwed on top of each other and thus stacked and also can be combined with beam splitters.

They are set at a small wedge angle in the housing so as not to cause interference effects.



ND1, ND2 and ND3 stackable filters

Stackable filter showing wedge

### Transmission vs. Wavelength

These bulk-absorbing "neutral density" or ND filters do not have a flat response in attenuation vs. wavelength. See the graph for typical transmission vs. wavelength characteristics.

### Specifications

Model	ND1 Stackable Filter (Red housing)	ND2 Stackable Filter (Black housing)	ND3 Stackable Filter (Green housing)
Nominal ND (vis)	1	2	3
Transmission <sup>(1)</sup>	between 20% and 5%	between 7% and 0.5%	between 2% and 0.05%
Clear Aperture	Ø19mm		
Damage threshold	~50W/cm <sup>2</sup> / 1J/cm <sup>2</sup> for ns pulses		
Part number	SPZ08234 <sup>(2)</sup>	SPZ08235 <sup>(3)</sup>	SPZ08253
Notes:	(1) Depending on spectral range. (2) One ND1 filter is included in Ophir cameras. (3) Two ND2 filters are included in Ophir cameras.		

