

ACCESSORIES

Specifications



IF YOUR **LASER**
SPECIFICATIONS EXCEED
THE LIMITS IN TERMS OF

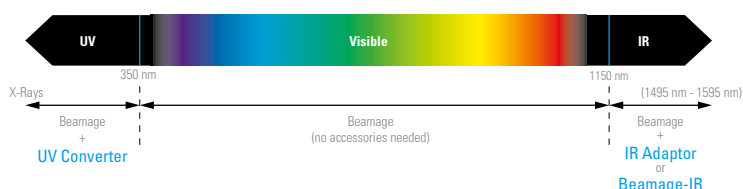
- > **WAVELENGTH**
- > **BEAM SIZE**
- > **LASER POWER**

YOU CAN MANAGE THEM WITH THE ACCESSORIES PRESENTED BELOW



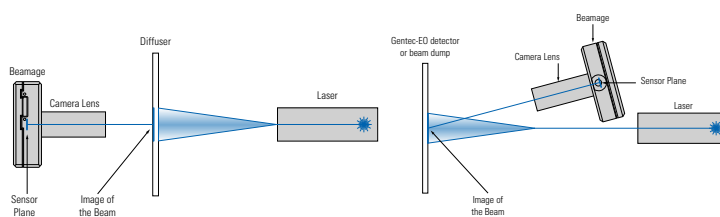
MANAGE THE WAVELENGTH

Since CMOS sensors are not sensitive to every frequency of the electromagnetic spectrum, we offer several wavelength management solutions to enhance the capabilities of the Beamage beam profiling cameras.



MANAGE THE BEAM SIZE

A simple solution is offered to those who need to profile beams that are larger than the CMOS sensor (> 11.3 mm x 11.3 mm). This solution is a beam reducing optical component called camera lens. It works either by indirectly imaging the transmission of the beam after it has passed through a diffusing element or by directly imaging the beam that is incident on a Gentec-EO detector or beam dump.



MANAGE THE LASER POWER

CMOS sensors have low saturation levels as well as low damage thresholds. It is thus very important that you control your laser power to get the best measurement possible and avoid damaging the Beamage camera.

- For laser power under 1 W, you can attenuate the beam with ND filters
- For laser power up to 1000 W, you can sample a small fraction of the beam with a BA optical sampler

ND

Neutral density (ND) filters - up to 1 W



KEY FEATURES

- **FOR ALL BEAMAGE MODELS**
We offer various SM1-threaded absorptive ND filters that can be fixed directly on the aperture of the Beamage camera via a SM1 to C-mount adaptor. We also offer SM2-threaded filters that can be fixed on the Beamage-4M-FOCUS via a SM2 to T-Mount adaptor.
- **HIGH-QUALITY OPTICS**
These filters reduce the intensity of all wavelengths without affecting the wavefront of the beam or distorting the image.
- **STACKABLE ATTENUATION**
Subsequent filters can be stacked directly on each other. Sets of 3 filters or 6 filters as well as individual filters are available.

COMPATIBLE PRODUCTS



BEAMAGE-3.0/4M



BEAMAGE-4M-FOCUS
(for BA32-1KW only)



PH series


OVERVIEW OF THE MODELS

MODEL NAME		EQUIVALENT ATTENUATION	TRANSMITTANCE AT 633 NM
SM1 FILTERS	SM2 FILTERS		
ND0.5	ND0.5-FOCUS	(1/3.16)	~32%
ND1.0	ND1.0-FOCUS	(1/10)	~10%
ND2.0	ND2.0-FOCUS	(1/100)	~1%
ND3.0	ND3.0-FOCUS	(1/1000)	~0.1%
ND4.0	ND4.0-FOCUS	(1/10 000)	~0.01%
ND5.0	ND5.0-FOCUS	(1/100 000)	~0.001%
NDSET-6 (Set of 6 filters)			
NDSET-3 (Set of 3 filters: ND1, ND2, ND3)			
ND-H (ND filter holder)			

ND

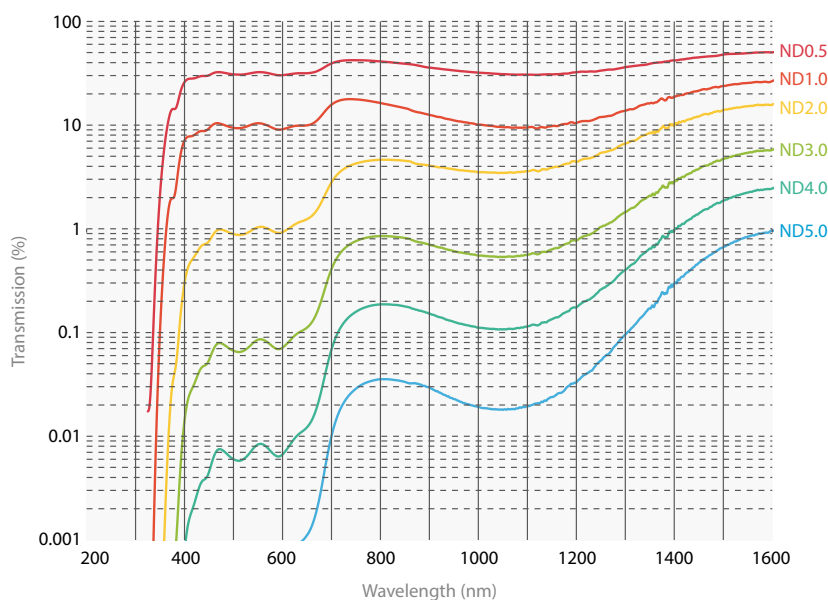
Specifications



ND0.5 TO ND5.0	
Spectral range	400 nm* - 1595 nm
Filter diameter	25 mm Ø
Clear aperture	22.5 mm Ø (90% of diameter)
Dimensional tolerance	+0.0/-0.25 mm
Optical density tolerance	± 5%
Parallelism	< 10 arcsec
Transmitted wavefront error	< λ/10 at 633 nm
Surface flatness	< λ/4
Surface quality	40 - 20 Scratch-Dig
Maximum power	1 W
Damage thresholds	100 W/cm² or 3 J/cm²
Product page	

* Data specified at 633 nm
a. For ND4.0 filter, lower limit with other models.

SPECTRAL TRANSMISSION OF ALL FILTERS



BA

Optical attenuators - up to 1 kW

New product



KEY FEATURES

- **MANAGE THE LASER POWER**
CMOS sensors have low saturation levels as well as low damage thresholds. It is thus very important that you control your laser power to get the best measurement possible and avoid damaging the BEAMAGE camera.
- **SAMPLE YOUR LASER BEAM**
The BA series optical attenuators use Fresnel reflections on two orthogonal wedges to pick off a small fraction of the input beam. The incoming beam polarization state and irradiance are preserved.

MULTIPLES USES

- Monitor power and beam profile simultaneously
- Polarization insensitive beam-splitter with no back-reflections
- Optical pick-off for use with our energy or power detectors
- Attenuator for our high sensitivity detectors like M6 series and PH series

COMPATIBLE PRODUCTS



BEAMAGE-3.0/4M



BEAMAGE-4M-FOCUS
(for BA32-1KW only)



UP55N-40S-H9
(for BA32-1KW only)



PH series



M6 series

ACCESSORIES



BA32 mounting kit for
BEAMAGE-3.0/4M



BA32 mounting kit for
BEAMAGE-4M-FOCUS



BA32 mounting kit for
UP55N-40S-H9

BA

Specifications



	BA16-60S	BA16K-150S-H5-D0	BA16K-500F-H9-D0	BA32-1KW
MAXIMUM POWER	60 W	150 W	500 W	1000 W
EFFECTIVE APERTURE	16 mm Ø	16 mm Ø	16 mm Ø	32 mm Ø
COOLING METHOD	Convection	Convection	Fan	Water
MEASUREMENT CAPABILITY				
Spectral range	200 - 2100 nm	200 - 2100 nm	200 - 2100 nm	200 - 2100 nm
Integrated power detector	N/A	UP19K-15S-H5-D0	UP19K-110F-H5-D0	Compatible with UP55 series (not included)
Fan input voltage	N/A	N/A	12 VDC	N/A
Equivalent attenuation	1/1700 @ 1064 nm	1/1700 @ 1064 nm	1/1700 @ 1064 nm	1/1900 @ 1064 nm
Optical wedges material	UV fused silica (uncoated)	UV fused silica (uncoated)	UV fused silica (uncoated)	UV fused silica (uncoated)
Residual beam deviation	5.6°	5.6°	5.6°	3.6° @ 1064 nm
Polarization correction	Yes (pair of orthogonal wedges)	Yes (pair of orthogonal wedges)	Yes (pair of orthogonal wedges)	Yes (pair of orthogonal wedges)
DAMAGE THRESHOLDS				
Maximum power	60 W	150 W	500 W	1000 W
Maximum average power density	10 MW/cm²	10 MW/cm²	10 MW/cm²	10 MW/cm²
Maximum energy density	10 J/cm²	10 J/cm²	10 J/cm²	10 J/cm²
PHYSICAL CHARACTERISTICS				
Aperture diameter	16 mm Ø	16 mm Ø	16 mm Ø	32 mm Ø
Dimensions	45H x 47W x 81D mm	54H x 50W x 91D mm	54H x 54H x 126D mm	145H x 250W x 132D mm
Weight	0.26 kg	0.37 kg	0.46 kg	5.5 kg
Mounting thread	SM1	SM1	SM1	SM2
Included adaptor	SM1 external threaded tube	SM1 external threaded tube	SM1 external threaded tube	N/A
ORDERING INFORMATION				
Compatible Stand	STAND-S-233	STAND-S-233	STAND-S-233	Call
Product Page				

UV CONVERTERS

Wavelength management




UV Converters take advantage of a phenomenon called fluorescence to extend the performance range of the Beamage beam profiling camera to ultraviolet wavelengths. A fluorescent crystal located at the entrance of the converter absorbs UV wavelengths and reemits longer wavelengths (in the visible spectrum), which are less energetic and detected by the CMOS sensor.

MAIN CHARACTERISTICS

- Transforms wavelengths contained between X-rays and 400 nm to visible and near-IR wavelengths.
- Images larger beams due to the magnification properties of the optics.
- Built with an iris at the output port for a control of the exposure on the CMOS sensor.
- Removable extension tube that is easily fixed onto the entrance port of the Beamage camera.
- Ready to use within minutes

SPECIFICATIONS

	BSF23C11.3N	BSF23P11.3N	BSF23R11.3N	BSF23G11.3N
Input Aperture Ø	23 mm	23 mm	23 mm	23 mm
Overall Length (OAL)	97 mm	97 mm	97 mm	97 mm
Magnification	1.4	1.4	1.4	1.4
Crystal Type	C	P	R	G
Wavelength range	110 - 225 nm	10 - 350 nm	110 - 532 nm	X-ray - 400 nm
Saturation level				
193 nm	400 mJ/cm ²	30 mJ/cm ²	50 mJ/cm ²	10 mJ/cm ²
248 nm	N/A	30 mJ/cm ²	400 mJ/cm ²	10 mJ/cm ²
308 nm	N/A	50 mJ/cm ²	400 mJ/cm ²	50 mJ/cm ²
Decay time	3 - 5 µs	5 µs	4000 µs	0.1 µs
Max repetition rate	20 - 30 kHz	20 kHz	25 Hz	20 kHz
Product page				

A complete procedure on how to choose the appropriate UV Converter (UV Converter Application Note) is available on our website at www.gentec-eo.com.

IR ADAPTOR

Wavelength management



Typically, a CMOS silicon sensor is operating at its full potential when imaging lasers with wavelengths between 350 nm and 1150 nm. If you want to extend the performance range of your Beamage beam profiling camera to the near-IR telecom wavelengths band, you can use the IR Adaptor. This ideal solution takes advantage of a multi-photon absorption process to extend the sensitivity range of the camera sensor to a portion of the near-IR spectrum (1495 nm - 1595 nm).

MAIN CHARACTERISTICS

- Converts wavelengths between 1495 nm and 1595 nm to shorter wavelengths between 950 nm and 1075 nm.
- Images larger beams due to the convergent properties of the optics (3.29X).
- Built with a high quality coated anti-reflection input window that allows wavelength conversion with low distortion and maximum image resolution.
- Removable and easily C-mounted onto the entrance port of the camera.
- Ready to use within minutes.

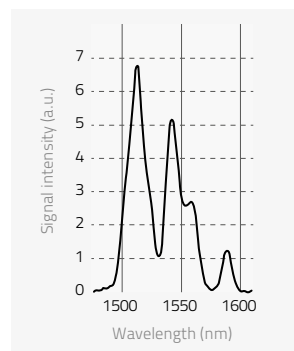
SPECIFICATIONS

IR ADAPTOR	
Active area	27.5 mm Ø
IR spectral range	1495 nm - 1595 nm
Peak IR sensitivity	1510 nm and 1540 nm
Converted wavelengths	950 nm - 1075 nm
Pixel Multiplication Factor	3.29
Minimum beam size	230 µm
Maximum beam size	19 mm
Maximum resolution	12 lp/mm over active area 40 lp/mm at sensor focal plane
Distortion	-1.0% barrel distortion (inverted image)
Linearity	Non-Linear, IR converted output ~ IR input intensity ¹ 1.41
Spectral transmission	360 nm - 2000 nm at F30.8
Damage threshold	1 W/cm²
Dimensions	46 mm Ø x 97 mm L
Operating temperature	-10°C to +40°C
Weight	210 g

Product page



EXCITATION SPECTRUM




FILTERS

Wavelength management

UV BANDPASS FILTER

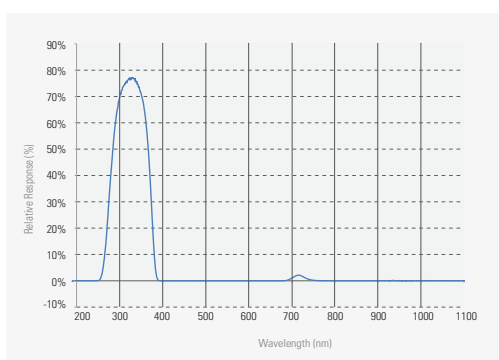
We also offer a color glass filter specially designed for the UV spectrum. Depending on the wavelength, the UG11-UV filter transmits 20% to 70% of the input beam power. It is particularly useful for applications with wavelengths contained between 250 nm and 370 nm. Other wavelengths are blocked by the filter. The UG11-UV is SM1 threaded and comes with a SM1 to C-mount adaptor.

SPECIFICATIONS

MODEL	UG11-UV
Spectral range	250 nm - 370 nm
Diameter	25 mm Ø
Clear aperture	80% of area
Dimensional tolerance	+0.0 / -0.2 mm
Thickness	3 mm
Thickness tolerance	+0.0 / -0.2 mm
Parallelism	< 3 arcmin
Surface flatness	< $\lambda/4$
Maximum power	1 W
Surface quality	40 - 20 Scratch-Dig
Damage threshold	30 W/cm ² (typical)
Product page	

* Data specified at 633 nm


SPECTRAL TRANSMISSION



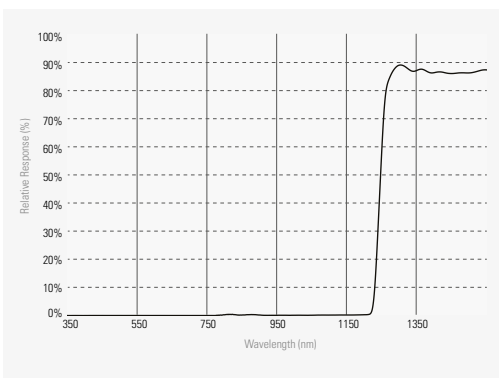
IR FILTER

The B3-IR-FILTER is a color glass filter specifically designed for IR applications. Acting as a longpass filter, the B3-IR-FILTER cuts all the wavelengths below 1250 nm and only lets the IR wavelengths pass. It transmits approximately 70% of the incident light. The B3-IR-FILTER is SM1 threaded and comes with a SM1 to C-mount adaptor so you can mount it on the Beamage camera.

SPECIFICATIONS

MODEL	B3-IR-FILTER
Spectral range	1250 - 1350 nm
Diameter	25 mm Ø
Clear aperture	80% of area
Dimensional tolerance	+0.0/-0.2 mm
Thickness	6.3 mm max
Parallelism	< 3 arcmin
Surface flatness	< $\lambda/4$
Maximum power	1 W
Surface quality	80-50 Scratch-Dig
Damage threshold	30 W/cm ² (Typical)
Product page	

SPECTRAL TRANSMISSION



CL

Beam size management



CAMERA LENSES

Camera lenses work by indirectly imaging on the sensor the reflection or the transmission of a beam that previously went through a diffusing material such as glass (see diagrams below).

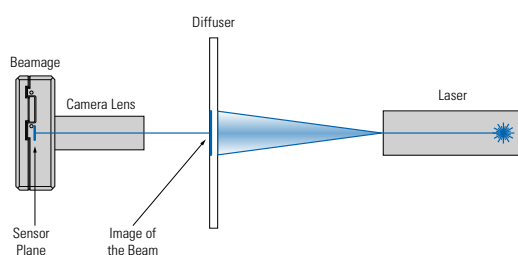
It is necessary to use a camera lens to image beams that are larger than the CMOS sensor (11.3 mm X 11.3 mm) of the Beamage beam profiling camera. A camera lens can be directly C-mounted onto the aperture of the Beamage camera.



SPECIFICATIONS

	CL-25	CL-50
Focal length	25 mm	50 mm
Horizontal FOV	14°	7°
FOV at 1m	245 mm	120 mm
Minimum working distance	0.5 m	1 m
Maximum beam size	2000 mm X 2000 mm (not a limiting factor)	2000 mm X 2000 mm (not a limiting factor)
Maximum measurable intensity / energy	Very high because of indirect mechanism	Very high because of indirect mechanism
Inverted image	Yes	Yes
Beam distortion	Setup, lens aberration and speckles from diffusing glass	Setup, lens aberration and speckles from diffusing glass
Diffusing material needed	Yes	Yes
Magnification calibration needed	Yes	Yes
Possibility of wavelength conversion	Yes	Yes
Optical filter needed	Rarely to never	Rarely to never
Removable	Yes	Yes
Product page		

IMAGING A TRANSMITTED BEAM



IMAGING A REFLECTED BEAM

