LP8000 UV BLOCK A/R PROTECTIVE WINDOW

MidOpt Protective Filters

MidOpt specializes in manufacturing custom made Protective Windows, which can be designed for nearly any type or size application at any wavelength range requirement. MidOpt custom windows can be manufactured from different substrates and include various coatings depending on the application requirements.

- Glass, acrylic, polycarbonate, sapphire and other substrates
- Oleophobic, anti-reflection, anti-smudge, anti-fog and hydrophobic coatings available
- Chemically strengthened glass options, including Gorilla Glass®
- Wavelength and polarization filtering
- Adhesive backing for easy fastening
- Custom silk screening service for borders, masking, fiducial marks, logos or patterns
- Available with various mounting configurations based on need

Protective Filter Applications

MidOpt Protective Filters are used to protect expensive or fragile optical elements from environmental hazards such as liquids, dust, dirt, and other debris.

LP Series - Protective Filters

- Variety of materials available with different physical properties
- Sapphire option for weld resistance
- Fused Silica option for low thermal expansion and high shock resistance
- Borofloat option for excellent strength, thermal, mechanical and solar properties (similar to that of Pyrex)
- Glass options for low-cost protection where dust covers are required
- Anti-Reflective coated glass offers low cost dust protection with improved optical properties
- UV Absorptive and Blocking Options to protect UV sensitive imagers from damaging Ultra-Violet light
- Germanium option for thermal imaging and LWIR (long-wave infrared)

APPLICATIONS: Protective filters are useful in nearly all imaging and sensing applications where optical protection is necessary from environmental contaminants

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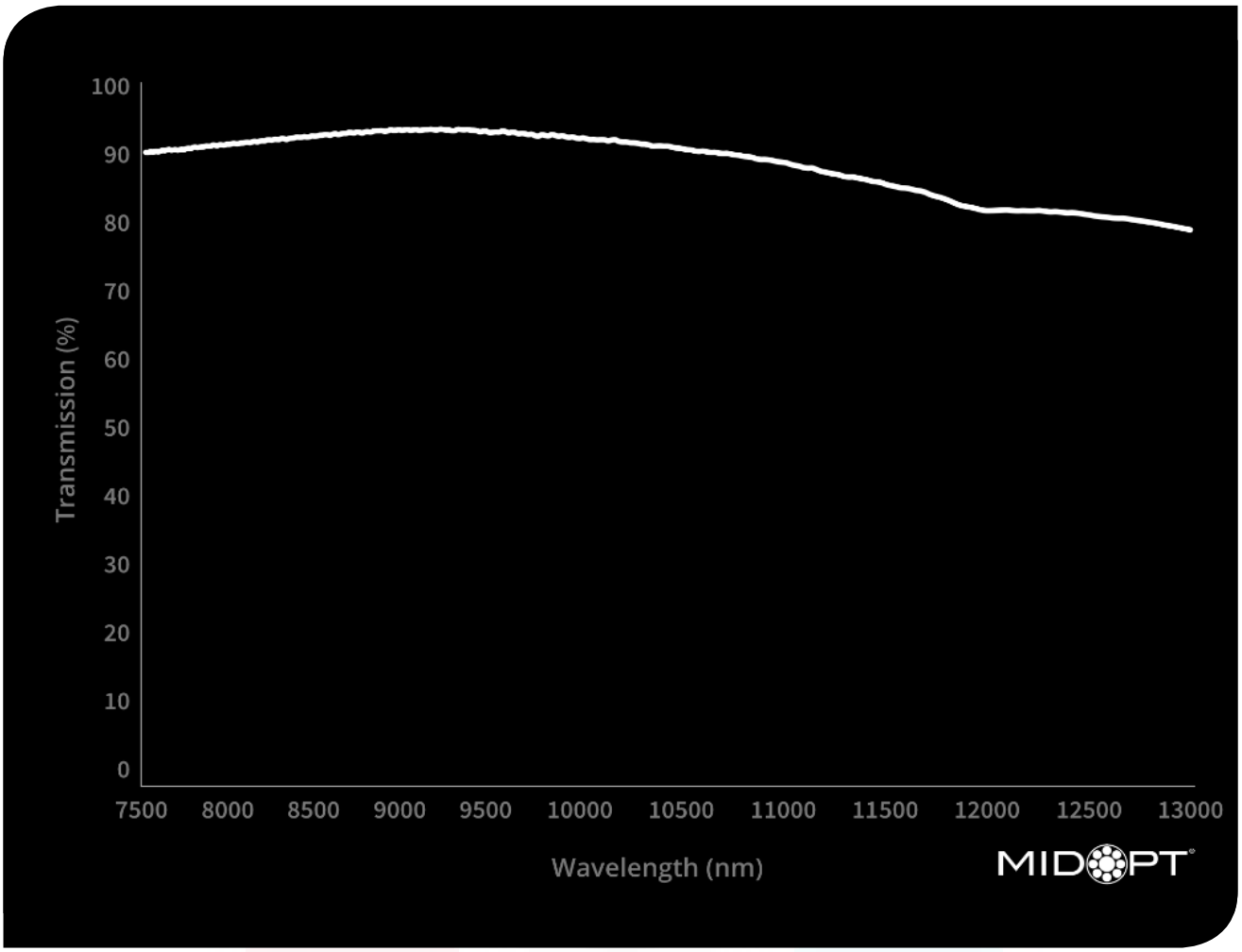

Useful Range:	7500-12500nm
Cut-on Wavelength 50% T:	5235nm
Tolerance:	+/- 10nm
Peak Transmission:	≥90%
Surface Quality:	40/20
STABLEDGE:	Yes

The MidOpt LP8000 Germanium Window has a DLC (diamond-like carbon) coating that is abrasion-resistant and can withstand harsh environments. It has a 7.5–12.5 micron useful range and is an ideal protective window for thermal camera enclosures. It also has an anti-reflection coating to maximize transmission when thermal imaging in the LWIR (long-wave infrared).

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LP8000 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
7500	89.9
7520	89.7
7540	89.8
7560	89.9
7580	89.9
7600	90.1
7620	90.2
7640	90.1
7660	90.2
7680	90.1
7700	90.3
7720	90.4
7740	90.4
7760	90.6
7780	90.6
7800	90.7
7820	90.7
7840	90.8
7860	91.1
7880	91.0
7900	91.1
7920	91.0
7940	91.2
7960	91.2
7980	91.3
8000	91.3
8020	91.4
8040	91.5
8060	91.5
8080	91.7
8100	91.6

Wavelength (nm)	Transmission (%)
8120	91.8
8140	91.8
8160	92.0
8180	92.1
8200	92.1
8220	92.2
8240	92.2
8260	92.2
8280	92.3
8300	92.3
8320	92.4
8340	92.5
8360	92.5
8380	92.7
8400	92.6
8420	92.8
8440	92.8
8460	92.9
8480	92.8
8500	93.0
8520	92.9
8540	93.0
8560	93.1
8580	93.3
8600	93.2
8620	93.4
8640	93.3
8660	93.4
8680	93.4
8700	93.5
8720	93.6

Wavelength (nm)	Transmission (%)
8740	93.6
8760	93.5
8780	93.6
8800	93.7
8820	93.7
8840	93.8
8860	93.7
8880	93.8
8900	93.7
8920	93.8
8940	93.7
8960	93.7
8980	93.8
9000	93.9
9020	93.8
9040	93.7
9060	93.9
9080	93.7
9100	93.7
9120	93.6
9140	93.6
9160	93.9
9180	93.8
9200	93.8
9220	93.7
9240	93.7
9260	93.4
9280	93.5
9300	93.5

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LP8000 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
9320	93.3
9340	93.3
9360	93.4
9380	93.5
9400	93.5
9420	93.2
9440	93.3
9460	93.3
9480	93.1
9500	93.1
9520	92.9
9540	93.0
9560	92.7
9580	92.6
9600	92.8
9620	92.7
9640	92.9
9660	92.8
9680	92.6
9700	92.7
9720	92.5
9740	92.4
9760	92.5
9780	92.3
9800	92.2
9820	92.3
9840	92.0
9860	92.1
9880	92.0
9900	92.0
9920	92.0

Wavelength (nm)	Transmission (%)
9940	91.8
9960	91.9
9980	92.0
10000	91.7
10020	91.6
10040	91.6
10060	91.5
10080	91.4
10100	91.2
10120	91.2
10140	91.1
10160	90.9
10180	90.9
10200	90.9
10220	90.9
10240	90.9
10260	90.7
10280	90.5
10300	90.5
10320	90.3
10340	90.3
10360	90.2
10380	90.2
10400	90.0
10420	89.9
10440	90.0
10460	89.8
10480	89.7
10500	89.8
10520	89.6
10540	89.5

Wavelength (nm)	Transmission (%)
10560	89.6
10580	89.4
10600	89.3
10620	89.2
10640	89.0
10660	89.0
10680	89.0
10700	88.9
10720	88.6
10740	88.5
10760	88.5
10780	88.4
10800	88.3
10820	88.1
10840	88.0
10860	88.0
10880	87.9
10900	87.6
10920	87.4
10940	87.3
10960	87.0
10980	86.9
11000	86.9
11020	86.6
11040	86.6
11060	86.3
11080	86.2
11100	86.0
11120	86.0

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LP8000 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
11140	85.9
11160	85.7
11180	85.4
11200	85.3
11220	85.3
11240	85.2
11260	85.2
11280	85.0
11300	84.8
11320	84.6
11340	84.5
11360	84.5
11380	84.3
11400	84.0
11420	83.8
11440	83.6
11460	83.6
11480	83.5
11500	83.4
11520	83.2
11540	83.0
11560	83.0
11580	82.9
11600	82.6
11620	82.2
11640	82.2
11660	82.0
11680	81.7
11700	81.4
11720	81.4
11740	81.1

Wavelength (nm)	Transmission (%)
11760	80.7
11780	80.3
11800	80.1
11820	80.1
11840	80.0
11860	79.8
11880	79.8
11900	79.5
11920	79.4
11940	79.4
11960	79.4
11980	79.4
12000	79.4
12020	79.4
12040	79.5
12060	79.4
12080	79.3
12100	79.3
12120	79.4
12140	79.3
12160	79.3
12180	79.3
12100	79.3
12220	79.4
12240	79.3
12260	79.1
12280	79.2
12300	79.1
12320	79.1
12340	79.0
12360	79.0

Wavelength (nm)	Transmission (%)
12380	79.0
12400	79.0
12420	78.9
12440	78.7
12460	78.7
12480	78.6
12500	78.4
12520	78.4
12540	78.3
12560	78.2
12580	78.1
12600	78.0
12620	78.0
12640	78.0
12660	78.0
12680	77.8
12700	77.8
12720	77.7
12740	77.5
12760	77.5
12780	77.3
12800	77.2
12820	77.0
12840	77.0
12860	76.8
12880	76.8
12900	76.6
12920	76.6
12940	76.4

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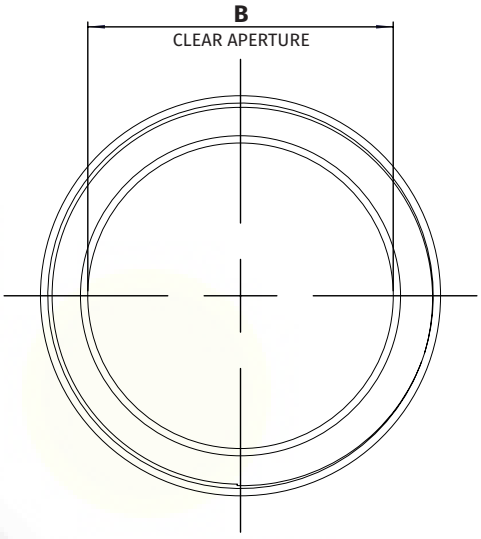
LP8000 TRANSMISSION DATA (TYPICAL)

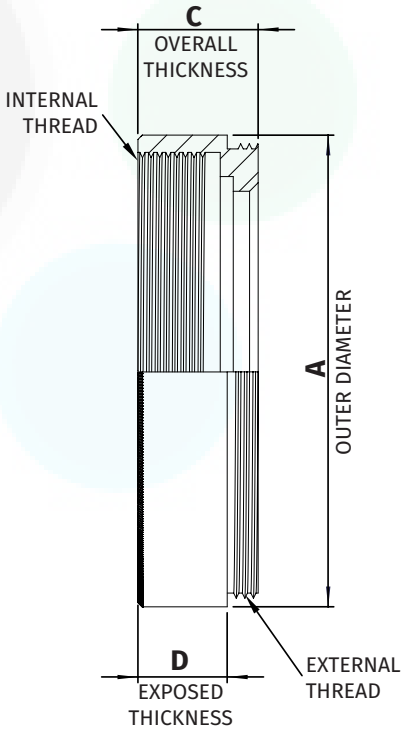
Wavelength (nm)	Transmission (%)
12960	76.2
12980	76.1
13000	76.0

STANDARD THREADED MOUNT DIMENSIONS

NOTES:

1. Inner and outer threads are of the same size and pitch.
2. Filter mount and retaining ring are black anodized aluminum.
3. All dimensions indicated in mm.
4. Tolerance: +/-0.3mm.

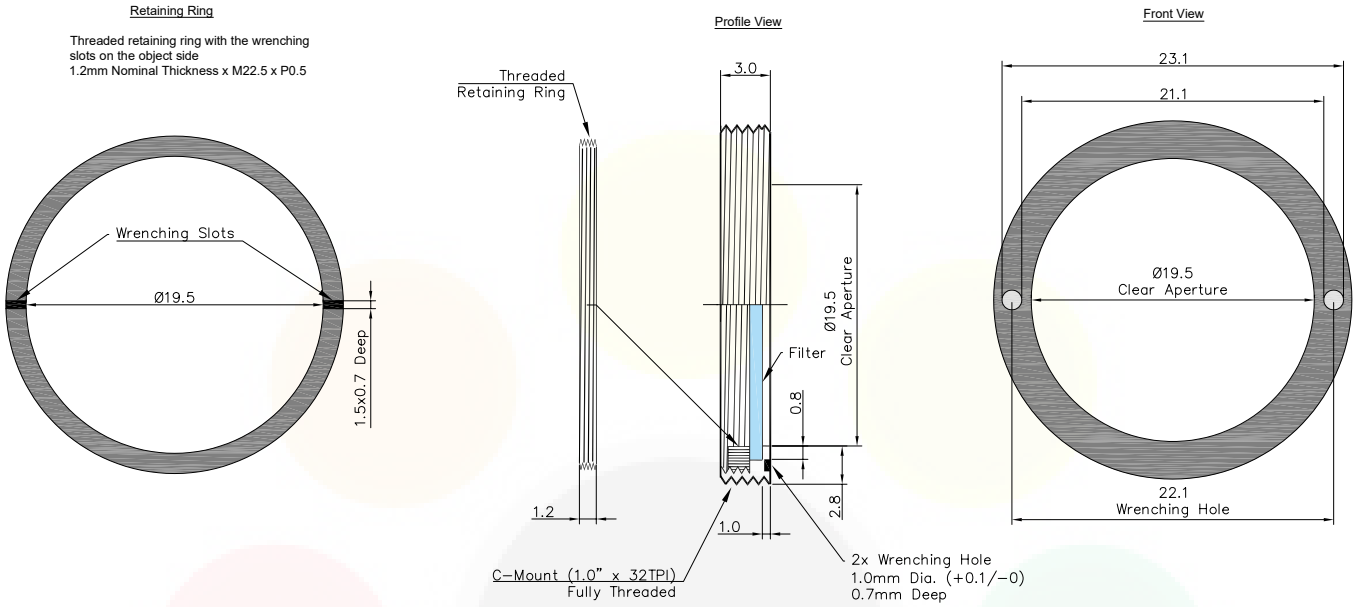




Mount Size	A	B	C	D
M13.25 x P0.5	14.3	10.6	7.5	5.7
M22.5 x P0.5	24	18.5	7	5.2
M25.5 x P0.5	27.5	21	7	5.2
M27 x P0.5	29	22.5	7	5.2
M30.5 x P0.5	32.5	25.5	7	5.2
M34 x P0.5	36	29	7	5.2
M35.5 x P0.5	37.5	30.5	7	5.2
M37 x P0.75	39	31.9	6.5	4.5
M37.5 x P0.5	39.5	32.5	7.2	5.2
M39 x P0.5	41	34	7	5.2
M40.5 x P0.5	42.5	35.5	7	5.2
M43 x P0.75	45	38	7	5.2
M46 x P0.75	48	41	7	5.2
M48 x P0.75	50	43	7	5.1
M49 x P0.75	51	44	7	5.2
M52 x P0.75	54	47	7	5.2
M55 x P0.75	57	50	7	5.2
M58 x P0.75	60	52.9	6.5	4.5
M62 x P0.75	64	57.1	7	5.2
M67 x P0.75	70	61.8	6.5	4.5
M72 x P0.75	75	66.9	6.5	4.5
M77 x P0.75	80	71.9	6.5	4.5
M82 x P0.75	85	76.8	6.5	4.5
M86 x P1.0	89	80.8	6.5	4.5
M95 x P1.0	98.2	89.9	10	7.1
M105 x P1.0	109.8	100	11	8

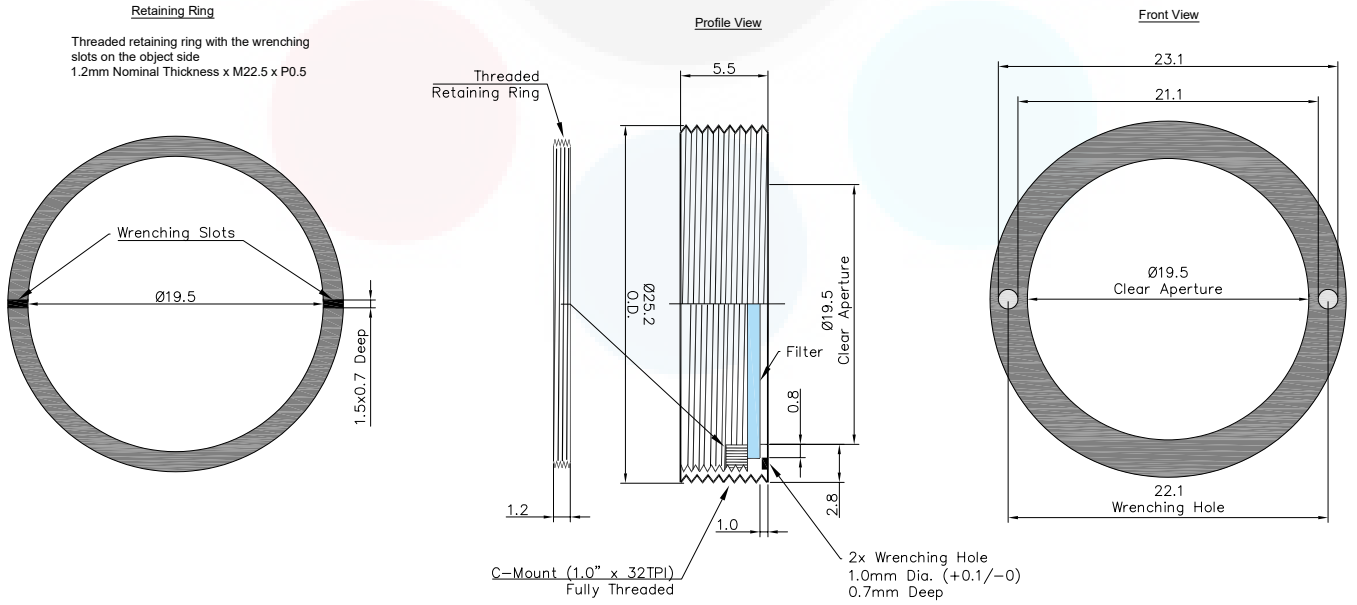
C-MOUNT DIMENSIONS (-25.4)

C-Mount is available on filters with a substrate thickness of 1mm or less



C-MOUNT SIS DIMENSIONS (-25.4-SIS)

C-Mount SIS is available on filters with a substrate thickness greater than 1mm and less than or equal to 3.5mm



MOUNTS FOR ANY SYSTEM

Midwest Optical Systems is the world's leading resource in machine vision filters and optical solutions. MidOpt's innovative filter designs ensure flawless control, dependable results and unmatched image quality. Mounting solutions are available for any system for lenses with and without filter threads, the exclusively designed 25.4™ C-Mount, and custom fabrication of unmounted shapes and sizes.

› THREADED MOUNT *Designed for Lenses with Filter Threads*

- MidOpt offers the largest variety of filters in-stock and ready to ship
- Sizes available: M13.25-M105
- Black anodized aluminum
- Custom thread sizes are available upon request

CREATE PART #: *Select a filter and add a mount size (e.g. M27) Example: BP470-27*

› 25.4™ C-MOUNT *Threads into all C-Mount Cameras*

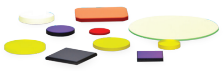
- 25.4™ C-Mount Camera Filter exclusively designed by MidOpt to thread directly into any C-Mount Camera between the lens and sensor
- Recommended for use with wide angle lenses to prevent vignetting and angle shift
- Helpful in applications with space constraints and lenses without filter threads
- Custom installation wrench included

CREATE PART #: *Select a filter and add "-25.4" Example: BP470-25.4*

› SLIP MOUNT *Designed for Wide Angle Lenses Without Filter Threads*

- Accommodates standard threaded mounts
- Low profile and oversize diameter design prevents wide angle lens vignetting
- Includes black Delrin® Slip Mount adapter plus Threaded Mount Filter

CREATE PART #: *Select a filter, use "S" for slip and add the outside diameter of lens in mm (e.g. 43mm) Example: BP470-S43*



› UNMOUNTED

- Any MidOpt filter type can be provided as an Unmounted Filter
- Custom shapes and sizes are typically available within a two week lead time with many shipped same day

CREATE PART #
CIRCLE: *Use "D" and add diameter in mm (e.g. 19mm) Example: BP470-D19*
SQUARE: *Use "R" and add side measurement in mm (e.g. 15mm) Example: BP470-R15*
RECTANGLE: *Use "R" and add length in mm (e.g. 30mm) x width in mm (e.g. 15mm) Example: BP470-R30x15*

› CUSTOM SOLUTIONS FOR M12 MOUNT LENSES

- Offered in aluminum slip mount over the lens
- Can be optically cemented behind the lens

Mount Sizes

› THREADED

Mount Size	Pitch
M13.25	0.5
M22.5	0.5
M25.5	0.5
M27	0.5
M30.5	0.5
M34	0.5
M35.5	0.5
M37	0.75
M37.5	0.5
M39	0.5
M40.5	0.5
M43	0.75
M46	0.75
M48	0.75
M49	0.75
M52	0.75
M55	0.75
M58	0.75
M62	0.75
M67	0.75
M72	0.75
M77	0.75
M82	0.75
M86	1.0
M95	1.0
M105	1.0

› C-MOUNT
M25.4™

› SLIP MOUNT

Outside Diameter Range	Threaded Mount
15.1-19.0	M22.5
19.1-26.5	M30.5
26.6-31.9	M40.5
32.0-40.9	M46
41.0-50.9	M55
51.0-57.9	M62
58.0-68.0	M72
68.1-79.0	M82
79.1-101.0	M105

› UNMOUNTED
Custom Shapes & Sizes Available

› M12 MOUNT

Outside Diameter Range	Part #
13.2-14.2	S14A
14.3-15.0	S15A

HOW TO ORDER

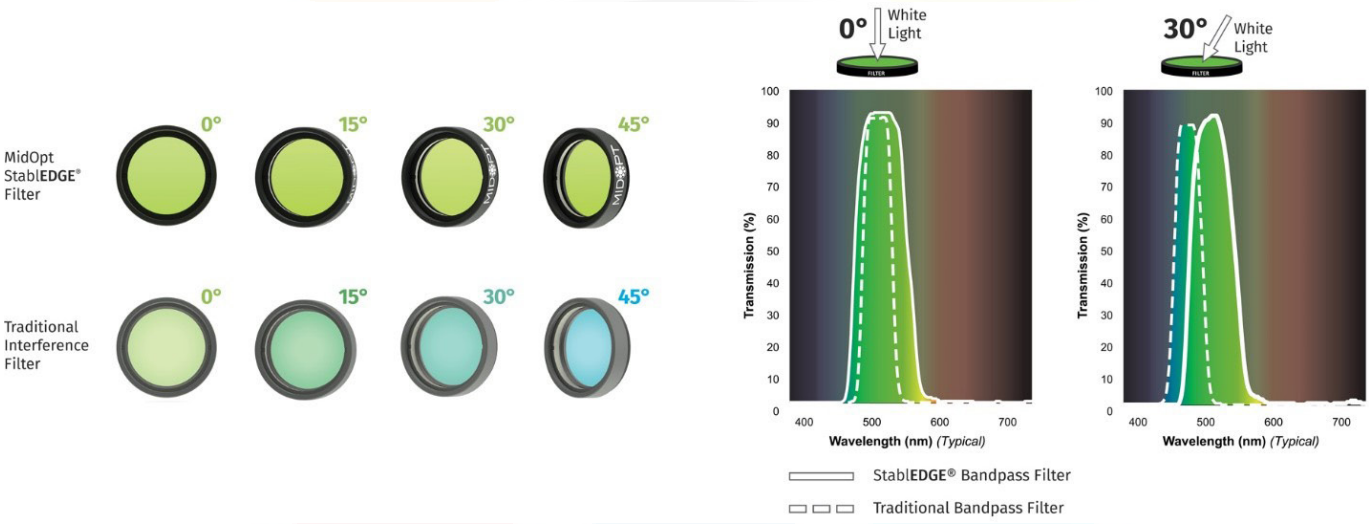
To order a filter with a threaded mount, first select a filter (e.g. BP470) and add the mount size (e.g. M27) to build your part number (e.g. BP470-27).

MIDOPT STABLEDGE®

Minimize the Effects of Short Shifting

MidOpt StablEDGE® optical filters are specifically designed to be less susceptible to effects from angular shifting seen when optical filters are placed in front of short focal length (<12mm) camera lenses. This feature is becoming increasingly important as today's trend in machine vision imaging progresses towards more compact inspection layouts, which utilize less space – forcing the camera and lens closer to the subject. As a result, short focal length lenses are now more widely used than ever before.

Using a traditional coated interference filter in these more compressed configurations results in contrast loss toward the edges of the image. Because of the angle imposed by the field of view (FOV) of the lens, the passband shifts and allows short wavelength ambient light to overwhelm the subject. Light from LED or laser diode lighting is also cut off. In contrast, peak transmission of MidOpt's StablEDGE® filters is not significantly altered, and effects due to short shifting are minimized.



StablEDGE® filters take advantage of absorptive filter glass to form the leading edge of the filter passband. This assures no shifting in this region, even when the lens FOV exceeds 100°. Filter glasses also offer far superior lower wavelength blocking of ambient light, sharp transition slopes and unmatched durability. MidOpt's StablEDGE® Filter cut-off slopes utilize interference filter coatings, however the cut-off slope is positioned to be sufficiently broad, and the Gaussian passband profile ensures that excessive ambient light is not allowed to degrade image contrast. Thus, shifting will not significantly encroach into peak transmission, assuring angular insensitivity over the desired range.

Among all machine vision filter manufacturers, MidOpt is unique in incorporating StablEDGE® technology across a full range of products. StablEDGE® designs are less angle-of-incidence sensitive, inherently more rugged, and are environmentally stable.