

LP389 PRECISION MULTI-LAYER VIS + NIR A/R COATED GLASS 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.

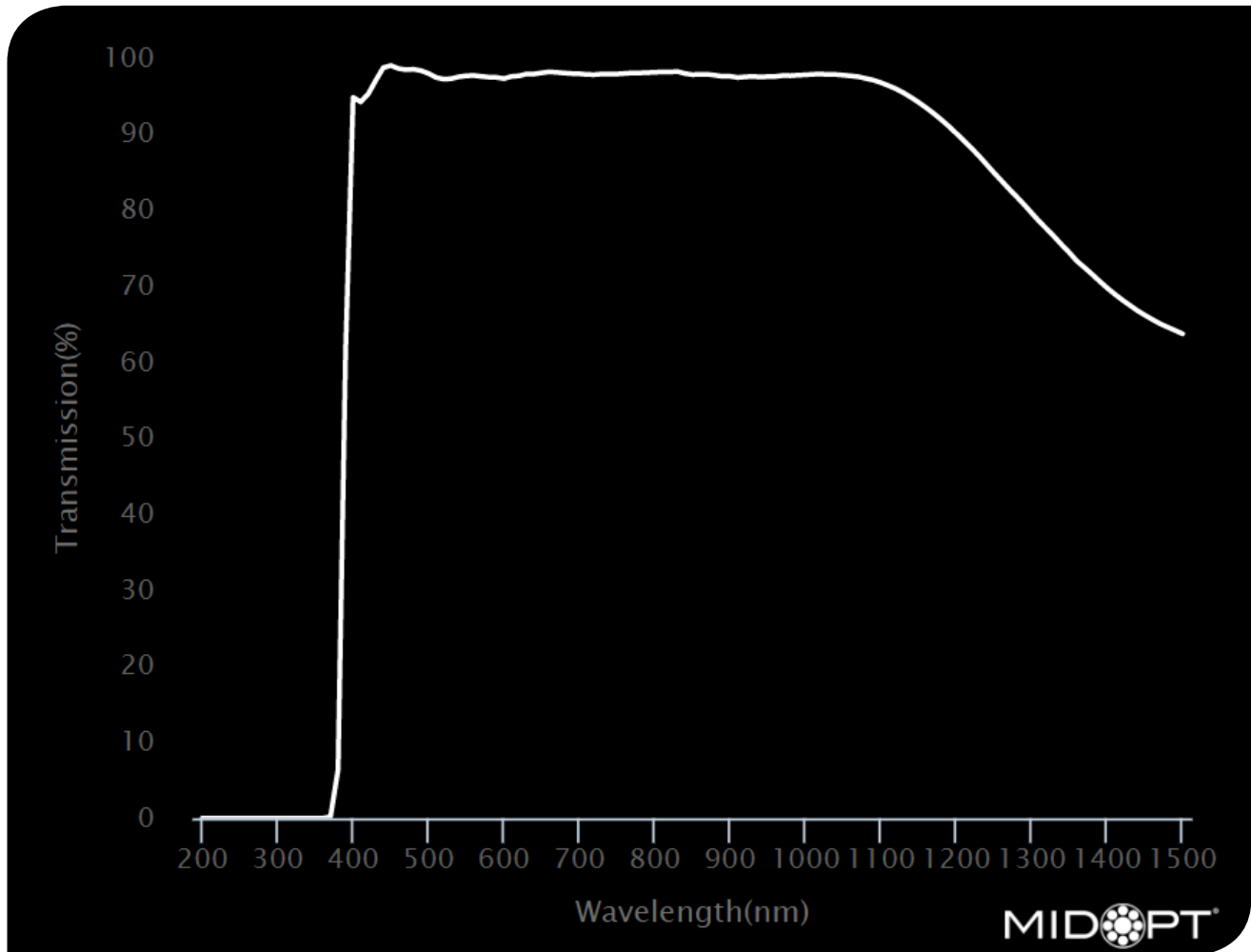
LP Series - Protective Filters

- 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

LP389

Protective Filters



Useful Range:	400-1100nm
Cut-on Wavelength 50% T:	380nm
Tolerance:	+/- 10nm
Peak Transmission:	≥98%
Surface Quality:	40/20
STABLEDGE:	Yes

LP389 anti-reflection coated windows are optimized for visible AND near-infrared transmission together, making them ideal for use with cameras that are required to operate 24/7, in 3D imaging, and in some LIDAR applications. The substrate material is optically ground and polished B270 crown glass. This results in distortion-free images and excellent transmission over a very broad wavelength range. An optional oleophobic top coat can also be provided.

LP389 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
1500	63.70
1490	64.15
1480	64.59
1470	65.03
1460	65.59
1450	66.15
1440	66.76
1430	67.46
1420	68.16
1410	68.92
1400	69.73
1390	70.61
1380	71.53
1370	72.41
1360	73.26
1350	74.37
1340	75.39
1330	76.46
1320	77.48
1310	78.47
1300	79.58
1290	80.68
1280	81.73
1270	82.74
1260	83.81
1250	84.87
1240	85.99
1230	87.09
1220	88.12
1210	89.11
1200	90.05

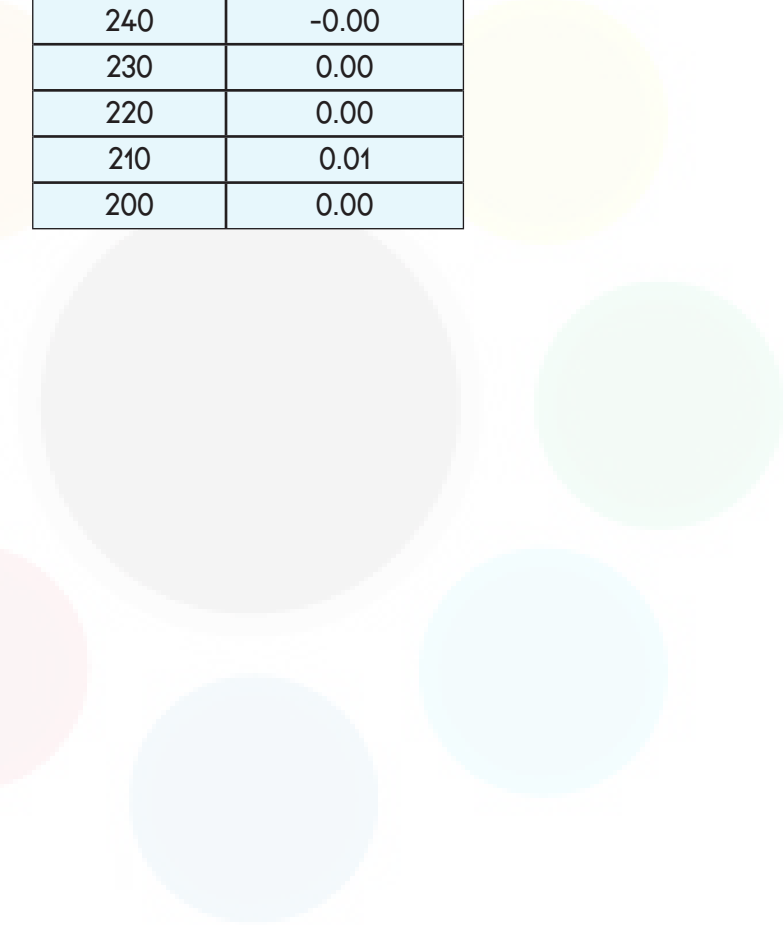
Wavelength (nm)	Transmission (%)
1190	91.00
1180	91.86
1170	92.68
1160	93.43
1150	94.14
1140	94.79
1130	95.39
1120	95.91
1110	96.34
1100	96.73
1090	97.06
1080	97.28
1070	97.51
1060	97.62
1050	97.72
1040	97.80
1030	97.79
1020	97.86
1010	97.83
1000	97.76
990	97.72
980	97.65
970	97.67
960	97.55
950	97.52
940	97.47
930	97.55
920	97.49
910	97.40
900	97.57
890	97.56

Wavelength (nm)	Transmission (%)
880	97.71
870	97.82
860	97.82
850	97.78
840	97.93
830	98.20
820	98.13
810	98.15
800	98.10
790	98.05
780	98.01
770	98.01
760	97.94
750	97.87
740	97.88
730	97.87
720	97.78
710	97.80
700	97.90
690	97.93
680	97.99
670	98.09
660	98.15
650	98.02
640	97.87
630	97.88
620	97.63
610	97.54
600	97.27

LP389 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
590	97.42
580	97.45
570	97.56
560	97.67
550	97.63
540	97.50
530	97.25
520	97.19
510	97.41
500	97.94
490	98.31
480	98.50
470	98.44
460	98.59
450	98.99
440	98.70
430	97.03
420	95.25
410	94.20
400	94.80
390	61.48
380	6.38
370	0.20
360	0.01
350	0.00
340	0.00
330	-0.00
320	0.00
310	0.00
300	0.00
290	0.00

Wavelength (nm)	Transmission (%)
280	0.00
270	0.00
260	0.00
250	0.00
240	-0.00
230	0.00
220	0.00
210	0.01
200	0.00

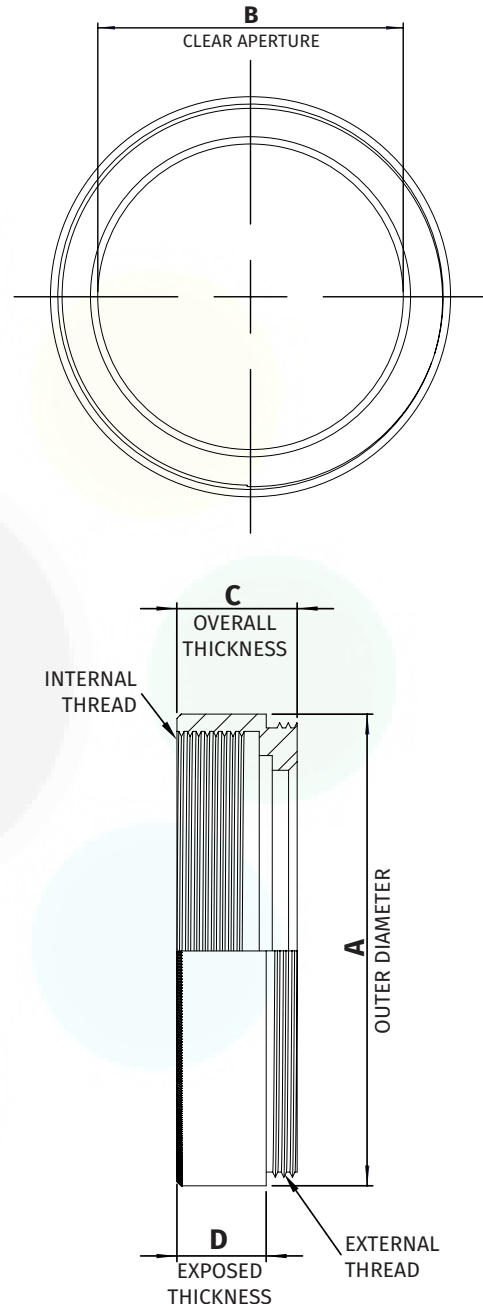


STANDARD THREADED MOUNT DIMENSIONS

NOTES:

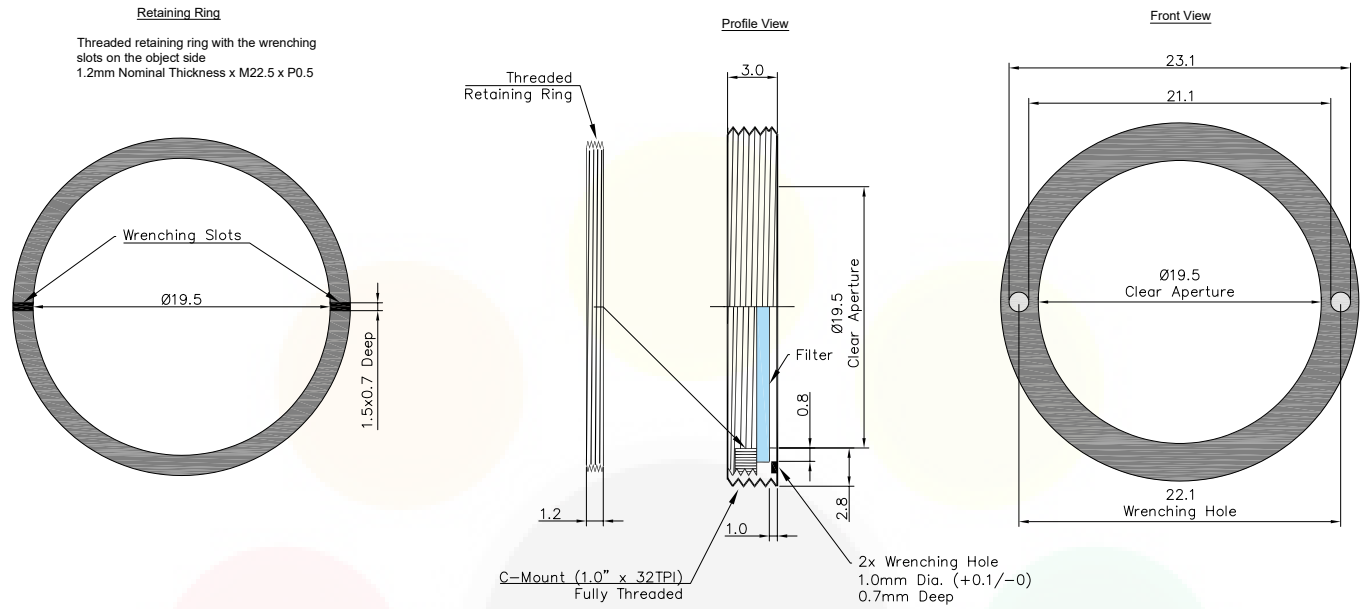
1. Inner and outer threads are of the same size and pitch.
2. Filter mount and retaining ring are black anodized aluminum.
3. All dimensions indicated in mm.
4. Tolerance: +/-0.3mm.

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



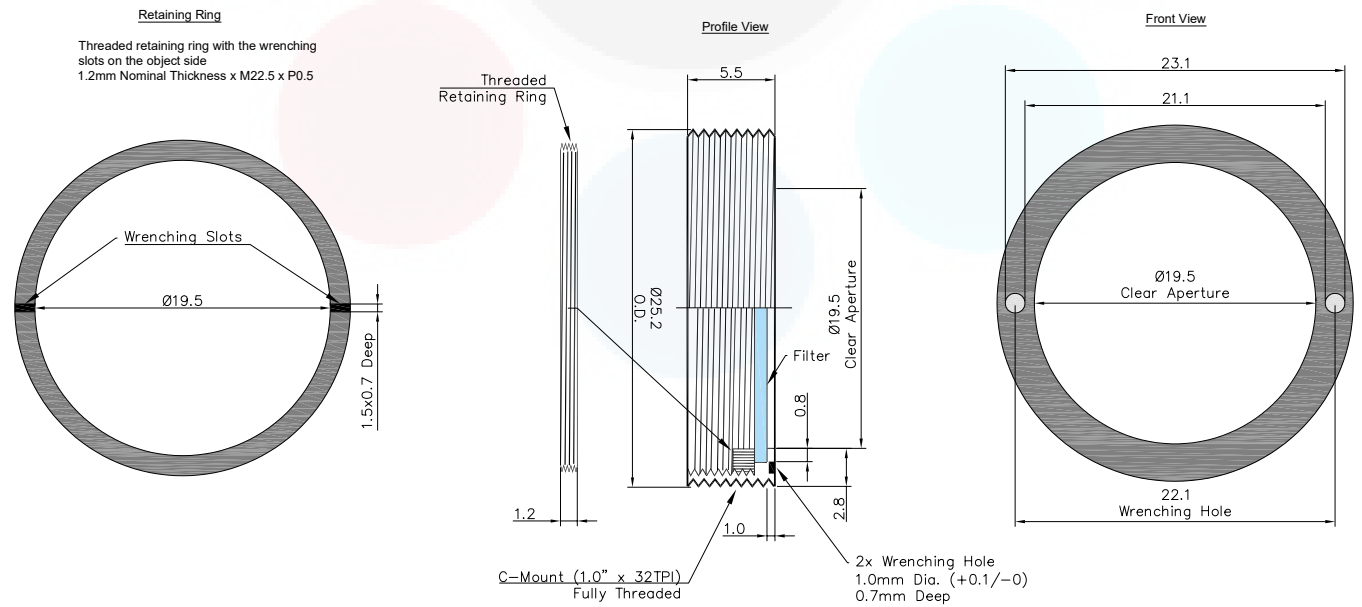
C-MOUNT DIMENSIONS (-25.4)

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.

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



› **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

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).

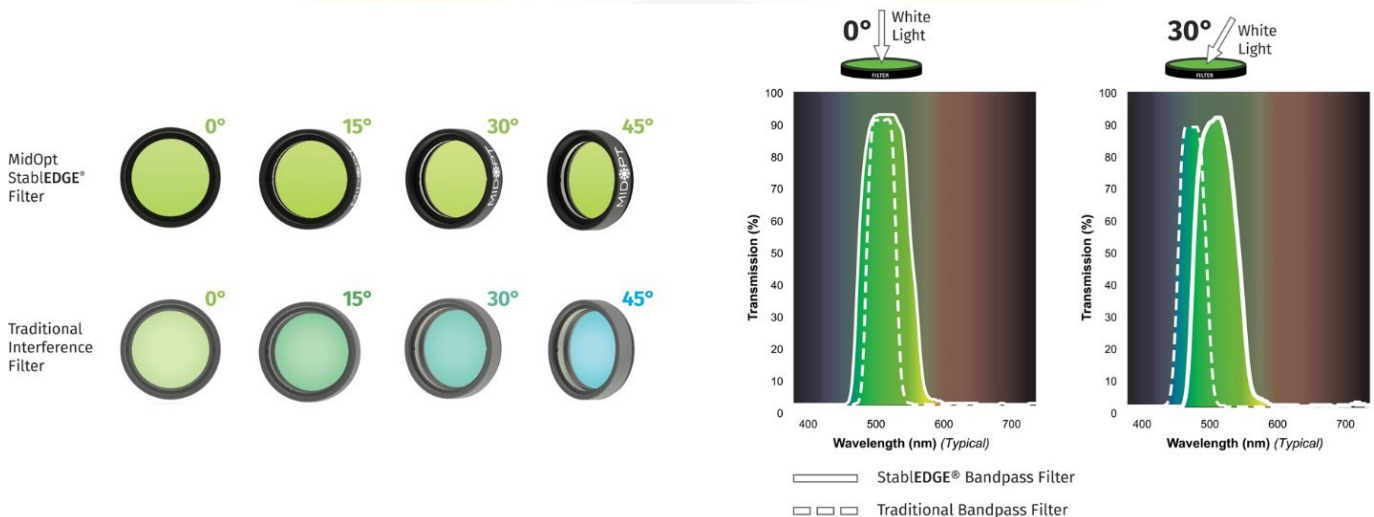


MIDOPT STABLEDGE®

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.

