DB395/870 DUAL BANDPASS ABSORPTIVE VISIBLE + NIR

MidOpt Dual Bandpass and Triple Bandpass Filters

- Available in UV, VIS and NIR passbands
- Achieve optimal contrast
- Improve system control, repeatability and stability
- Block interfering wavelengths, eliminating the need for shrouds
- Increase resolution by reducing chromatic aberration
- Anti-reflection coated for maximum transmission
- Hard coated, single substrate fabrication
- Exceptional surface quality; 40/20 scratch/dig

Dual Bandpass Filter Applications

MidOpt Dual Bandpass and Triple Bandpass Filters are most commonly used for security and surveillance, intelligent traffic solutions and Normalized Difference Vegetation Index (NDVI) imaging.

DB Series - Dual Bandpass Filters

- Pass visible light and a specific portion of the visible (VIS) and near-infrared (NIR) spectrums
- Ideal for color camera applications that utilize daytime sunlight and NIR illumination at night
- Achieve accurate color rendition by blocking interfering wavelengths
- Eliminate the need for dual sensor imaging
- Anti-reflection coated for maximum transmission
- Hard-coated, single-substrate fabrication
- Exceptional surface quality; 40/20 scratch/dig

APPLICATIONS: Dual Bandpass Filters are becoming increasingly popular in NDVI aerial drone inspection, allowing for single sensor imaging and reduced operation payload. NDVI, traditionally achieved by satellite imagery, can now be obtained utilizing Dual Bandpass Filters and personal aerial imaging devices.

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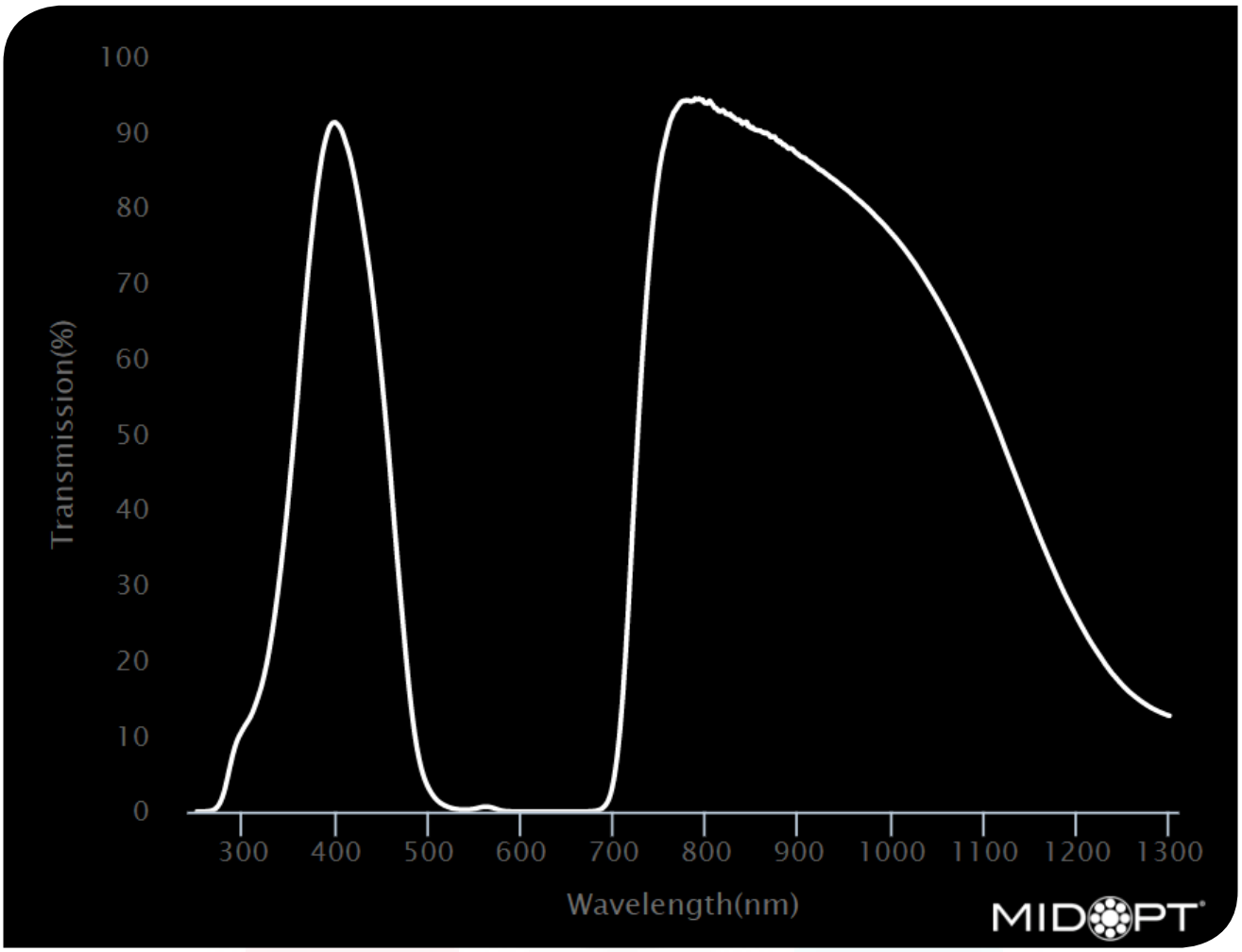
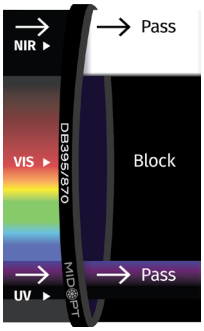
DB395/870

Dual Bandpass



Useful Range:	375-425nm, 745-970nm
FWHM:	110nm, 375nm
Tolerance:	+/- 10nm
Peak Transmission:	≥90%
Surface Quality:	40/20
STABLEDGE:	Yes



DB395/870 Dual Bandpass Filter passes UV-Violet and infrared wavelengths, effectively blocking all green and red light. These filters have traditionally found use in NDVI-type imaging applications. When using a single camera modified for aerial agricultural surveillance, incorporation of these so-called "Superblue" or "Infrablue" filters allows reflected near-infrared light (745-970nm) to be captured in the camera sensor's red channel and reflected violet light (375-425nm) to be captured in the sensor's blue channel (the green channel is not used). Even when using an inexpensive consumer camera (that has first had its IR blocking filter removed), this easy separation then makes it possible to post-process the red and blue channels for NDVI by performing the calculation: NDVI = (red – blue) / (red + blue). Healthy vegetation will absorb (not reflect) blue light and strongly reflect near-infrared light. While "Superblue" filters similar to DB395/870 have seen much use during recent years, for far better wavelength separation and contrast we strongly recommend the use of our newer DB475/850 or DB660/850 dualband filters instead.

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DB395/870 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
1300	12.73
1290	13.20
1280	13.81
1270	14.60
1260	15.55
1250	16.70
1240	18.08
1230	19.71
1220	21.55
1210	23.55
1200	25.78
1190	28.13
1180	30.73
1170	33.51
1160	36.42
1150	39.50
1140	42.67
1130	45.80
1120	49.00
1110	52.16
1100	55.13
1090	58.00
1080	60.68
1070	63.21
1060	65.57
1050	67.77
1040	69.82
1030	71.79
1020	73.59
1010	75.22
1000	76.69

Wavelength (nm)	Transmission (%)
990	78.05
980	79.32
970	80.47
960	81.55
950	82.60
940	83.62
930	84.49
920	85.35
910	86.26
900	87.06
890	87.91
880	88.84
870	89.44
860	90.09
850	90.72
840	91.35
830	92.04
820	92.74
810	93.28
800	93.98
790	94.41
780	94.26
770	93.64
760	91.12
750	85.70
740	75.02
730	58.51
720	36.65
710	15.74
700	4.19
690	0.70

Wavelength (nm)	Transmission (%)
680	0.10
670	0.02
660	0.01
650	0.00
640	0.01
630	0.01
620	0.01
610	0.01
600	0.01
590	0.02
580	0.13
570	0.49
560	0.65
550	0.39
540	0.26
530	0.35
520	0.69
510	1.45
500	3.16
490	6.94
480	15.36
470	28.37
460	43.01
450	56.96
440	68.34
430	77.19
420	84.23
410	88.97
400	91.33

MIDWEST OPTICAL SYSTEM, INC.

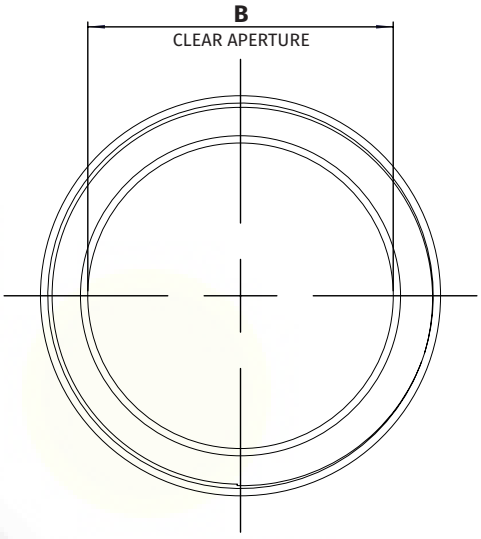
DB395/870 TRANSMISSION DATA (TYPICAL)

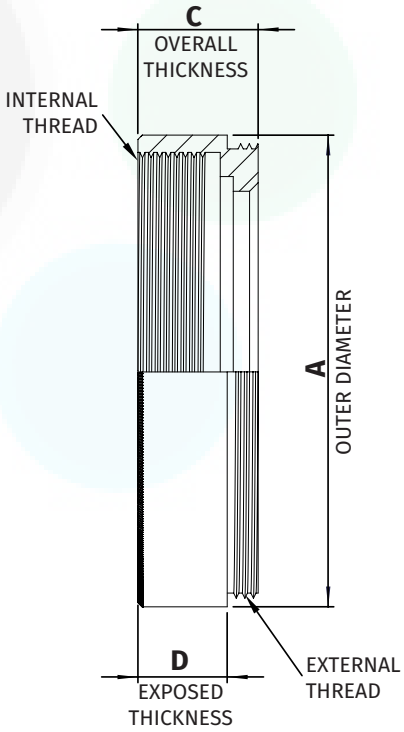
Wavelength (nm)	Transmission (%)
390	89.59
380	82.73
370	71.62
360	57.31
350	43.30
340	31.74
330	22.82
320	16.80
310	13.15
300	11.00
290	8.14
280	2.94
270	0.40
260	0.03
250	0.01

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.

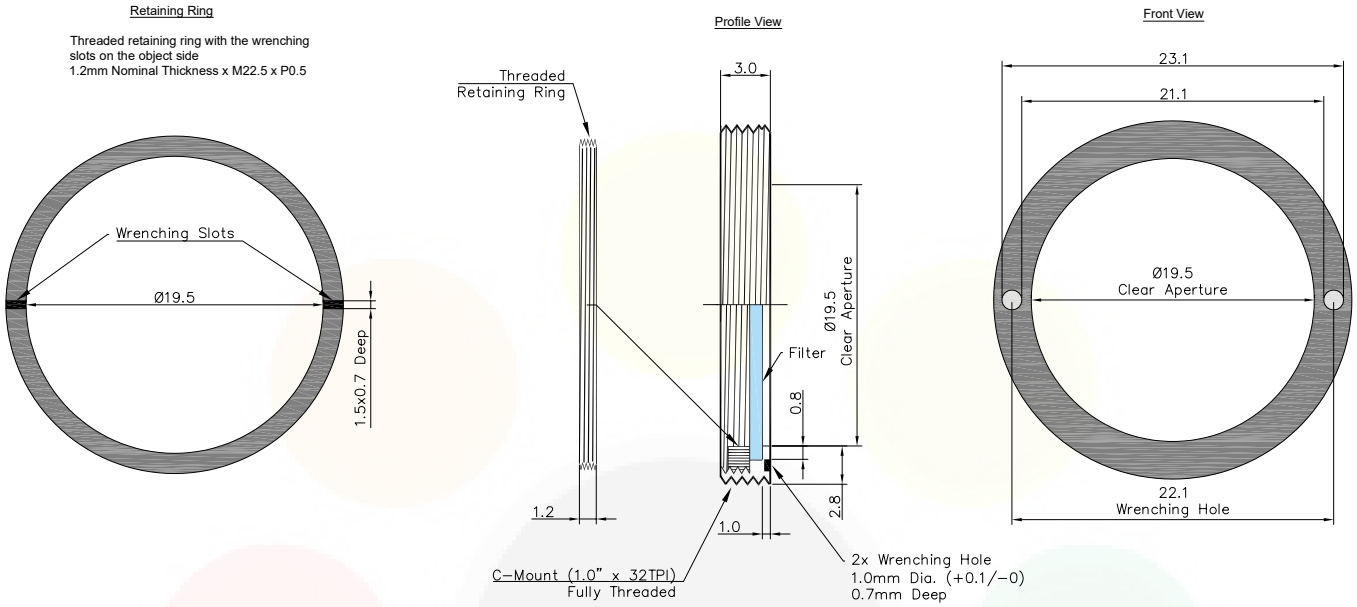




Mount Size	A	B	C	D
M13.25 x P0.5	14.3	10.6	7.5	5.7
M22.5 x P0.5	24	18.5	7	5.2
M25.5 x P0.5	27.5	21	7	5.2
M27 x P0.5	29	22.5	7	5.2
M30.5 x P0.5	32.5	25.5	7	5.2
M34 x P0.5	36	29	7	5.2
M35.5 x P0.5	37.5	30.5	7	5.2
M37 x P0.75	39	31.9	6.5	4.5
M37.5 x P0.5	39.5	32.5	7.2	5.2
M39 x P0.5	41	34	7	5.2
M40.5 x 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

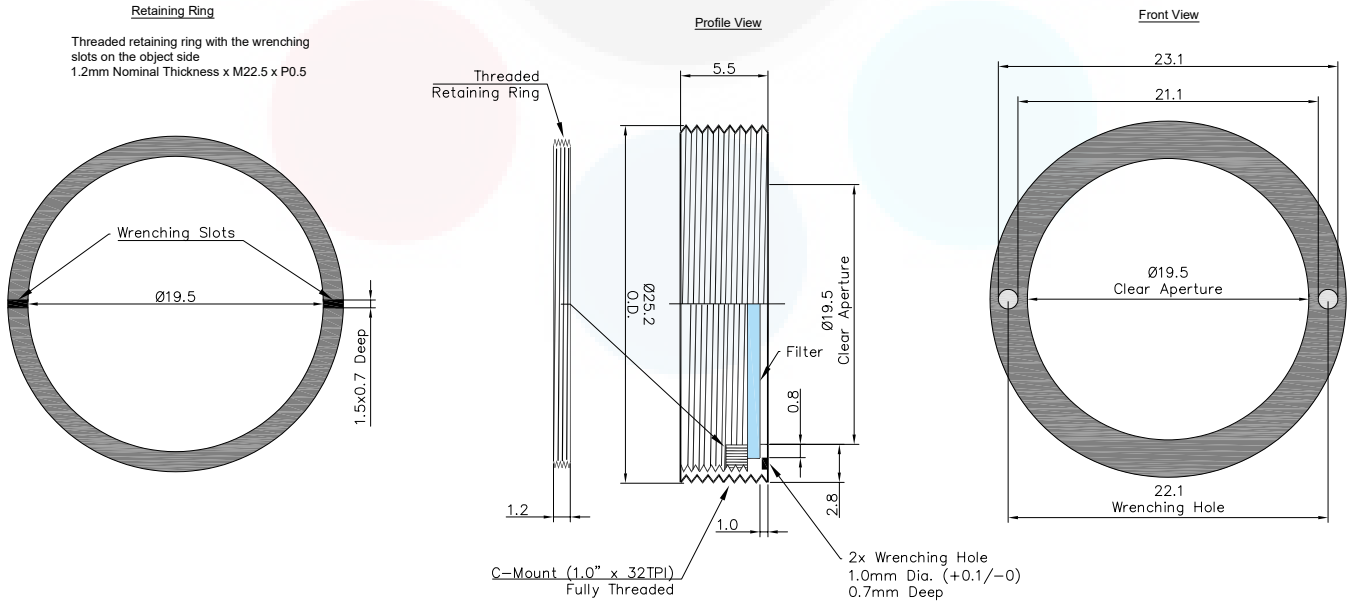
C-MOUNT DIMENSIONS (-25.4)

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*

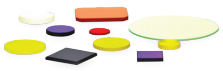
- 25.4™ C-Mount Camera Filter exclusively designed by MidOpt to thread directly into any C-Mount Camera between the lens and sensor
- Recommended for use with wide angle lenses to prevent vignetting and angle shift
- Helpful in applications with space constraints and lenses without filter threads
- Custom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

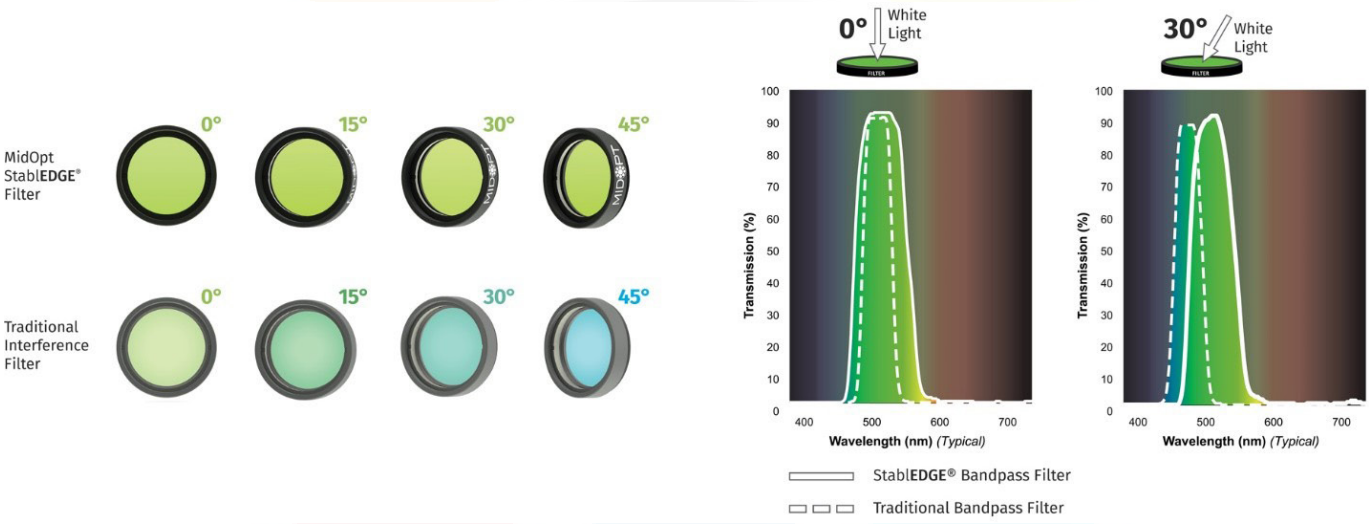
To order a filter with a threaded mount, first select a filter (e.g. BP470) and add the mount size (e.g. M27) to build your part number (e.g. BP470-27).

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.