

## Ni030 NEUTRAL DENSITY FILTER LOW REFLECTIVITY 50% TRANSMISSION

### MidOpt Neutral Density Filters

- Available in a variety of optical densities
- Reduce light intensity while maintaining a wide aperture and shallow depth of field. Every 0.3 density increment equals one f-stop
- Minimize pixel saturation
- Can be stacked with other Neutral Density Filters to test various optical densities
- Exceptional surface quality; 40/20 scratch/dig

### Neutral Density Filter Information

MidOpt Neutral Density Filters serves as “sunglasses” for your system and can be used with monochrome or color cameras.

### Ni Series - VIS/SWIR Filters

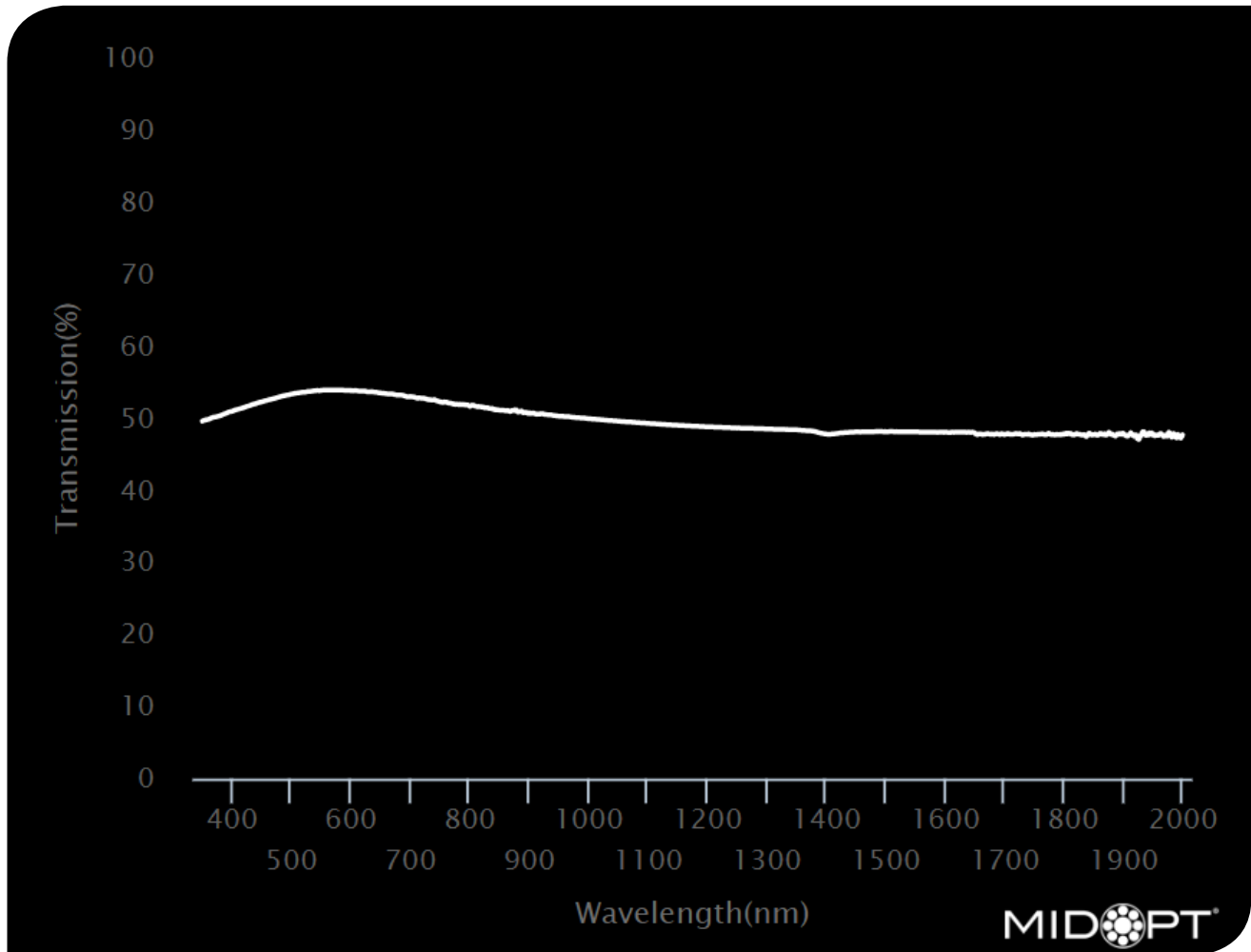
- Low reflectivity filter effective from 400-2000nm
- Available in optical densities ranging from 0.3-2.0
- Coated on low-expansion, heat-resistant Borofloat glass

**APPLICATIONS:** MidOpt Neutral Density filters are used to reduce light intensity neutrally over a specific wavelength range without affecting image color or contrast. Typical applications include welding,



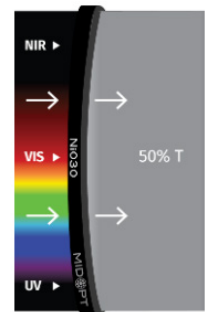
# Ni030

Neutral Density Filter



<b>Useful Range:</b>	400-2000nm
<b>Optical Density:</b>	0.3
<b>Average Transmission:</b>	50%
<b>Tolerance:</b>	+/- 5.00%
<b>Surface Quality:</b>	40/20

Ni030 filters feature uniform attenuation simultaneously over the visible and near-IR range that is imaged by most industrial CCD/CMOS cameras. That is, regardless of wavelength within this range, on average approximately 50% of the light will be transmitted while less than 10% will be reflected back towards the source or subject. These filters include identical male and female threads on either end so that they can be stacked with other ND filters to achieve various optical densities.



**Ni030 TRANSMISSION DATA (TYPICAL)**

Wavelength (nm)	Transmission (%)
2000	47.63
1990	47.45
1980	47.59
1970	47.53
1960	47.70
1950	47.78
1940	47.67
1930	47.84
1920	47.69
1910	47.73
1900	47.80
1890	47.73
1880	47.71
1870	47.73
1860	47.89
1850	47.74
1840	47.78
1830	47.65
1820	47.78
1810	47.88
1800	47.76
1790	47.73
1780	47.73
1770	47.72
1760	47.76
1750	47.75
1740	47.80
1730	47.65
1720	47.85
1710	47.77
1700	47.74

Wavelength (nm)	Transmission (%)
1690	47.78
1680	47.75
1670	47.84
1660	47.78
1650	47.86
1640	48.04
1630	48.05
1620	48.05
1610	48.03
1600	48.05
1590	48.04
1580	48.08
1570	48.08
1560	48.07
1550	48.10
1540	48.11
1530	48.11
1520	48.12
1510	48.15
1500	48.12
1490	48.16
1480	48.13
1470	48.13
1460	48.10
1450	48.09
1440	48.05
1430	48.00
1420	47.90
1410	47.82
1400	47.79
1390	47.93

Wavelength (nm)	Transmission (%)
1380	48.17
1370	48.26
1360	48.33
1350	48.39
1340	48.40
1330	48.44
1320	48.45
1310	48.48
1300	48.50
1290	48.55
1280	48.57
1270	48.59
1260	48.60
1250	48.62
1240	48.67
1230	48.71
1220	48.74
1210	48.77
1200	48.81
1190	48.86
1180	48.90
1170	48.93
1160	48.97
1150	49.02
1140	49.06
1130	49.11
1120	49.16
1110	49.23
1100	49.28



**Ni030 TRANSMISSION DATA (TYPICAL)**

Wavelength (nm)	Transmission (%)
1090	49.34
1080	49.41
1070	49.46
1060	49.51
1050	49.59
1040	49.66
1030	49.72
1020	49.80
1010	49.87
1000	49.93
990	50.02
980	50.08
970	50.15
960	50.24
950	50.28
940	50.39
930	50.49
920	50.60
910	50.63
900	50.75
890	50.75
880	50.90
870	51.01
860	51.04
850	51.11
840	51.22
830	51.44
820	51.57
810	51.67
800	51.66
790	51.91

Wavelength (nm)	Transmission (%)
780	51.92
770	52.03
760	52.25
750	52.30
740	52.57
730	52.56
720	52.78
710	52.82
700	53.01
690	53.10
680	53.21
670	53.34
660	53.39
650	53.51
640	53.61
630	53.64
620	53.78
610	53.80
600	53.84
590	53.85
580	53.89
570	53.88
560	53.92
550	53.86
540	53.81
530	53.72
520	53.59
510	53.49
500	53.34
490	53.16
480	52.95

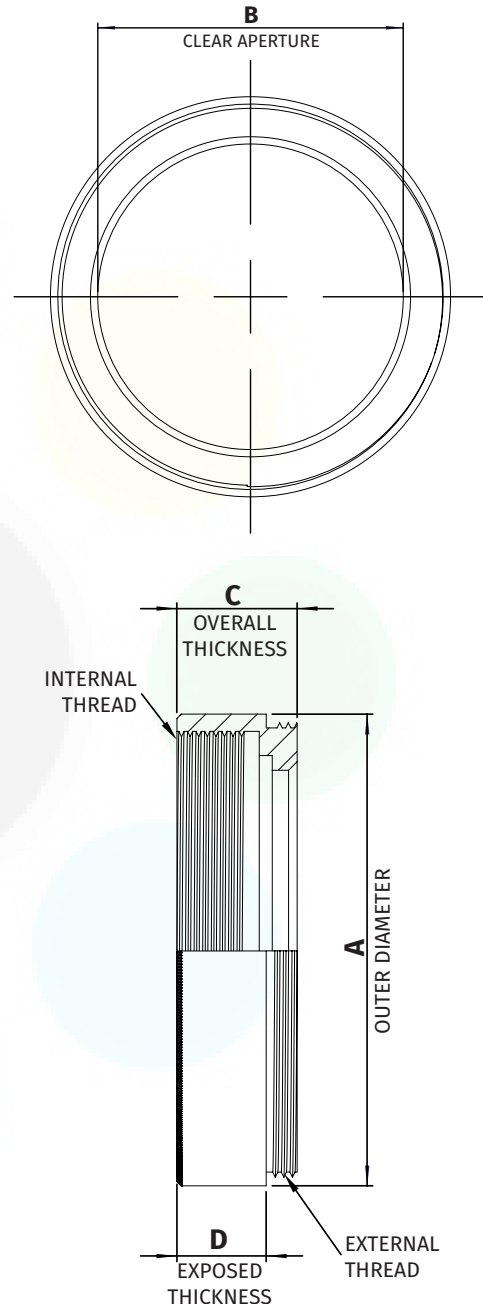
Wavelength (nm)	Transmission (%)
470	52.72
460	52.51
450	52.26
440	52.01
430	51.75
420	51.49
410	51.23
400	50.96
390	50.67
380	50.34
370	50.14
360	49.85
350	49.59

**STANDARD THREADED MOUNT DIMENSIONS**

**NOTES:**

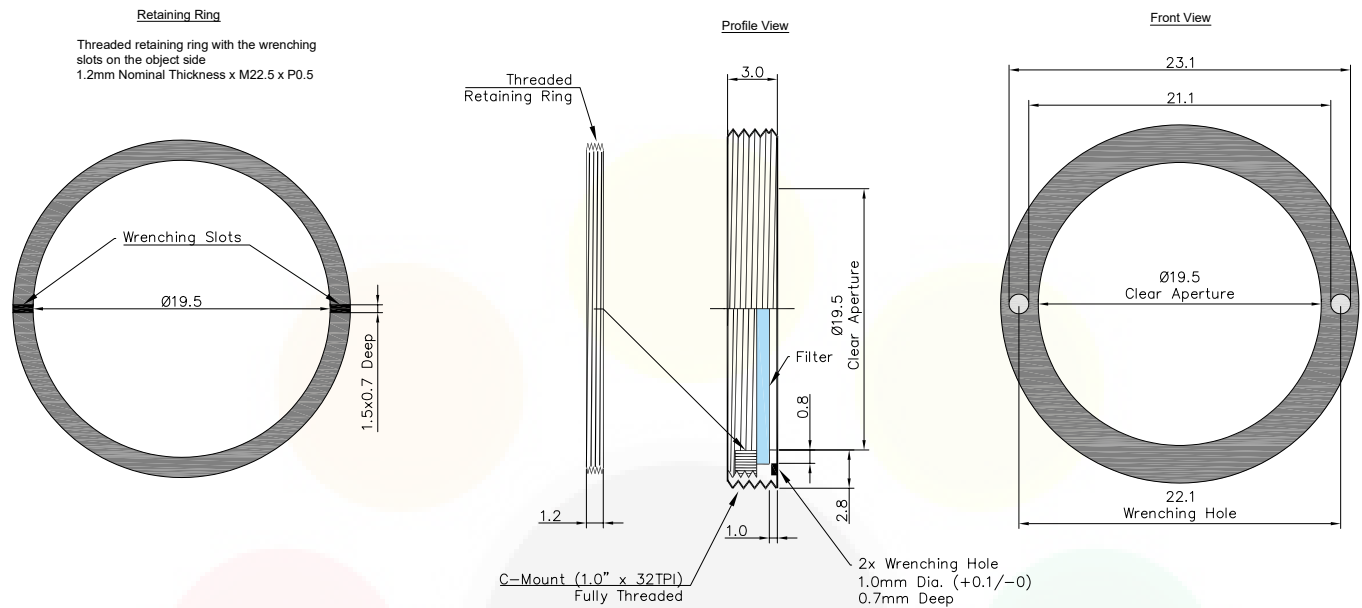
1. Inner and outer threads are of the same size and pitch.
2. Filter mount and retaining ring are black anodized aluminum.
3. All dimensions indicated in mm.
4. Tolerance: +/-0.3mm.

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



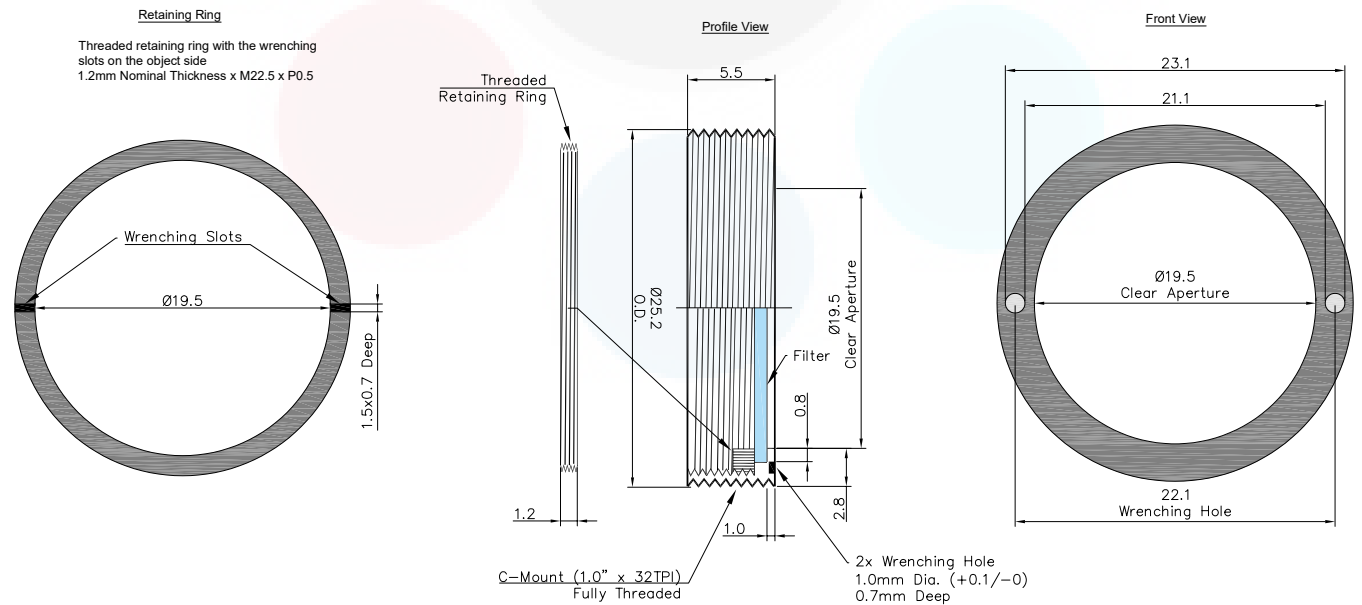
**C-MOUNT DIMENSIONS (-25.4)**

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).

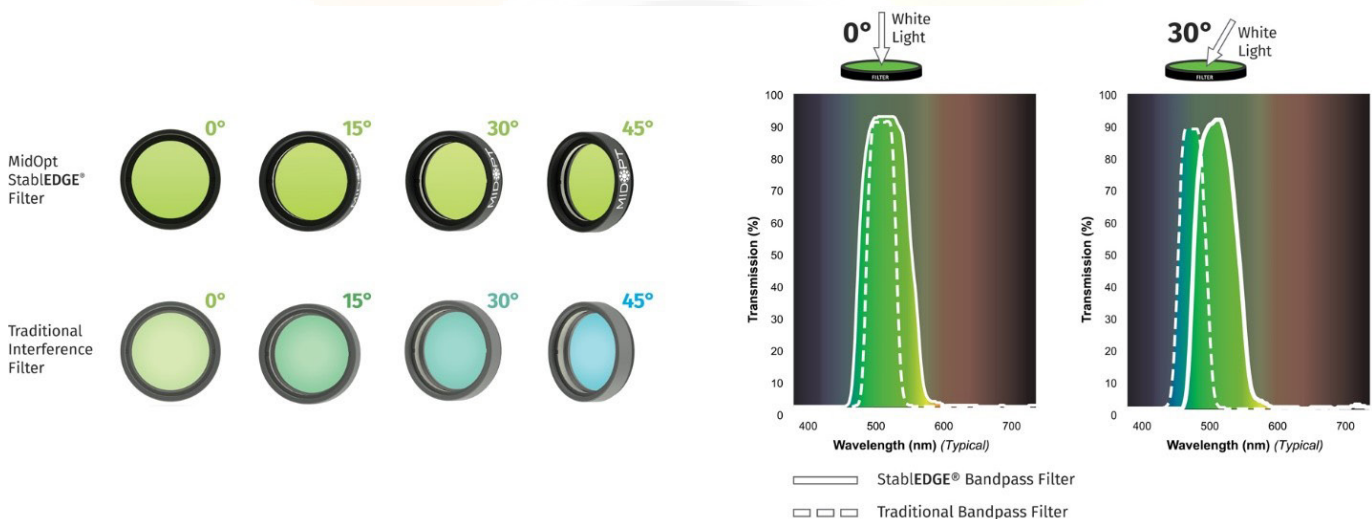


MIDOPT STABLEDGE®

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.

