

LP345 PRECISION MULTI-LAYER VIS 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.

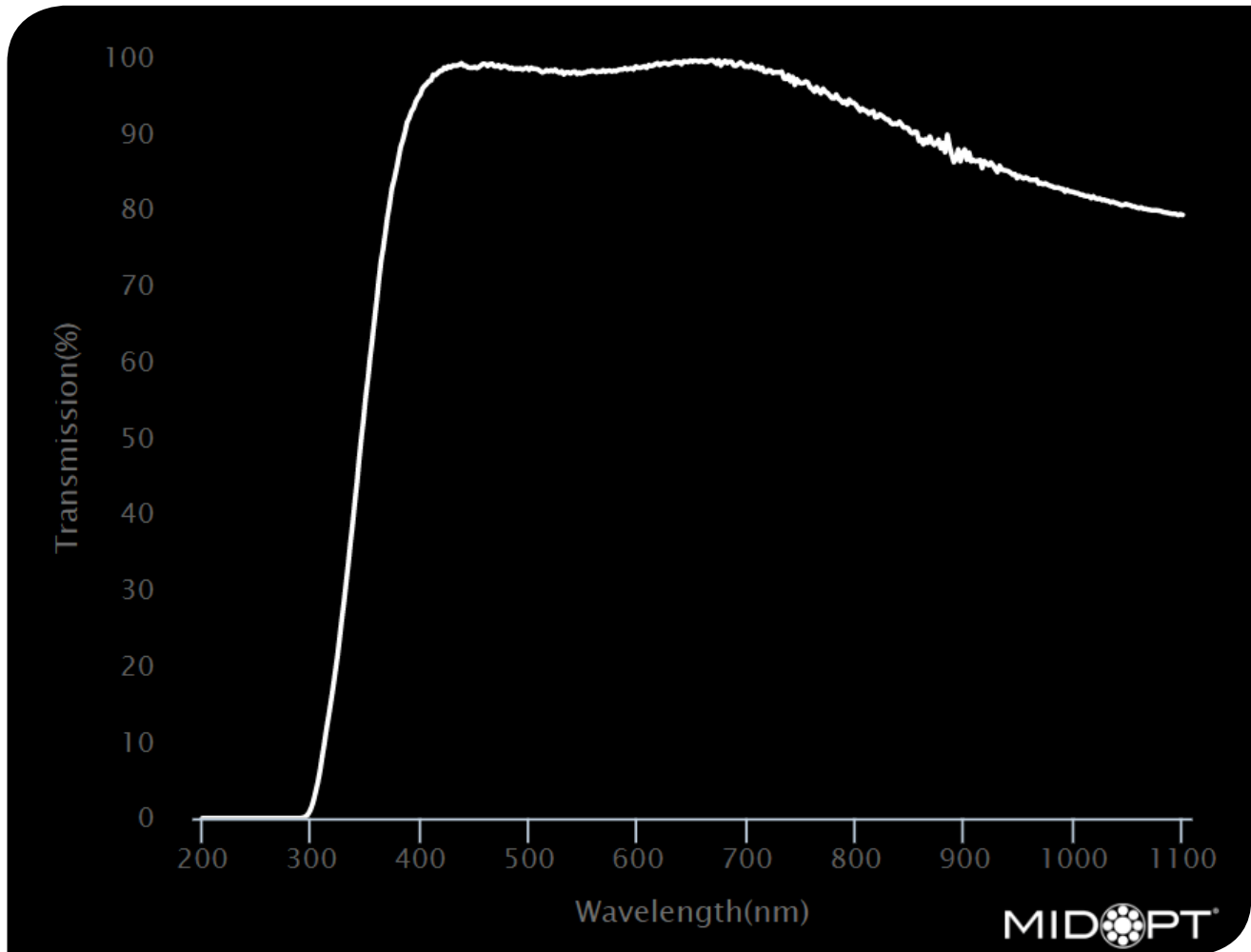
LP Series - Protective Filters

- 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

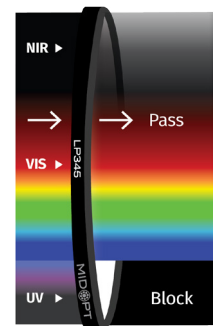
LP345

Protective Filters



Useful Range:	350-800nm
Cut-on Wavelength 50% T:	340nm
Tolerance:	+/- 10nm
Peak Transmission:	≥98%
Surface Quality:	40/20
STABLEEDGE:	Yes

LP345 Windows are made from made from precision polished BK7 optical crown glass, resulting in no image distortion and excellent transmission in the visible and near-infrared spectrums. They are environmentally stable, stain-resistant and virtually free of bubbles and inclusions. MidOpt LP345 Windows are precision double-side, “flip” precision ground and polished and are coated on both sides. These durable broadband, multilayer anti-reflection coatings limit glare and other reflection losses while helping to achieve optimal image quality.



LP345 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
1100	79.34
1098	79.42
1096	79.31
1094	79.45
1092	79.50
1090	79.49
1088	79.55
1086	79.63
1084	79.66
1082	79.72
1080	79.85
1078	79.90
1076	79.95
1074	79.93
1072	79.93
1070	80.00
1068	80.04
1066	80.15
1064	80.15
1062	80.32
1060	80.23
1058	80.30
1056	80.44
1054	80.45
1052	80.61
1050	80.67
1048	80.77
1046	80.67
1044	80.61
1042	80.73
1040	80.86

Wavelength (nm)	Transmission (%)
1038	80.95
1036	81.07
1034	80.98
1032	81.17
1030	81.20
1028	81.34
1026	81.30
1024	81.48
1022	81.44
1020	81.52
1018	81.78
1016	81.55
1014	81.79
1012	81.82
1010	81.83
1008	82.01
1006	82.01
1004	82.19
1002	82.22
1000	82.33
998	82.40
996	82.44
994	82.63
992	82.40
990	82.75
988	82.80
986	82.92
984	82.93
982	82.95
980	83.11
978	83.18

Wavelength (nm)	Transmission (%)
976	83.32
974	83.50
972	83.37
970	83.53
968	83.45
966	83.99
964	83.94
962	83.96
960	83.93
958	84.15
956	84.26
954	84.14
952	84.29
950	84.44
948	84.18
946	84.71
944	84.64
942	84.90
940	85.09
938	85.17
936	85.22
934	85.33
932	85.79
930	84.99
928	85.39
926	85.88
924	86.23
922	85.88
920	86.12



LP345 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
918	86.43
916	85.50
914	86.54
912	86.47
910	86.38
908	86.55
906	86.39
904	87.53
902	86.60
900	87.94
898	87.44
896	86.39
894	87.94
892	86.71
890	86.29
888	87.27
886	88.44
884	89.87
882	87.59
880	88.78
878	88.11
876	89.22
874	88.81
872	88.55
870	88.88
868	89.64
866	88.83
864	89.28
862	88.63
860	89.24
858	89.08

Wavelength (nm)	Transmission (%)
856	90.22
854	90.27
852	90.07
850	90.25
848	90.73
846	90.85
844	90.83
842	91.24
840	91.59
838	91.26
836	91.34
834	91.27
832	91.46
830	91.88
828	91.91
826	92.12
824	92.39
822	92.56
820	92.23
818	92.16
816	92.97
814	92.84
812	92.66
810	92.98
808	93.09
806	93.32
804	93.04
802	93.42
800	93.83
798	94.08
796	94.11

Wavelength (nm)	Transmission (%)
794	94.49
792	93.86
790	94.27
788	94.07
786	94.42
784	94.63
782	95.17
780	94.68
778	94.71
776	95.06
774	95.36
772	95.55
770	95.94
768	95.33
766	95.68
764	96.14
762	95.55
760	95.93
758	96.12
756	96.73
754	96.89
752	96.69
750	96.64
748	96.77
746	97.17
744	96.44
742	97.49
740	96.94
738	97.70



LP345 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
736	97.22
734	97.29
732	98.17
730	98.07
728	98.10
726	98.11
724	98.01
722	98.30
720	98.36
718	98.12
716	98.16
714	98.69
712	98.48
710	98.87
708	98.63
706	98.76
704	99.11
702	98.80
700	98.87
698	98.84
696	99.22
694	99.40
692	99.16
690	98.95
688	98.98
686	99.47
684	99.50
682	99.31
680	99.60
678	99.36
676	99.00

Wavelength (nm)	Transmission (%)
674	99.70
672	99.23
670	99.50
668	99.77
666	99.66
664	99.51
662	99.44
660	99.52
658	99.63
656	99.50
654	99.61
652	99.67
650	99.50
648	99.66
646	99.45
644	99.50
642	99.54
640	99.18
638	99.43
636	99.40
634	99.48
632	99.33
630	99.24
628	99.12
626	99.28
624	99.31
622	99.22
620	99.05
618	99.30
616	99.18
614	98.99

Wavelength (nm)	Transmission (%)
612	98.91
610	99.05
608	98.68
606	98.88
604	98.78
602	98.68
600	98.72
598	98.86
596	98.48
594	98.60
592	98.56
590	98.47
588	98.64
586	98.46
584	98.46
582	98.42
580	98.24
578	98.31
576	98.20
574	98.32
572	98.29
570	98.16
568	98.36
566	98.16
564	98.19
562	98.10
560	98.23
558	98.33
556	98.19



LP345 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
554	98.23
552	98.07
550	98.03
548	97.92
546	98.06
544	97.88
542	98.20
540	98.13
538	97.94
536	98.11
534	98.09
532	97.82
530	98.22
528	98.05
526	98.16
524	98.44
522	98.23
520	98.35
518	98.22
516	98.37
514	98.17
512	98.08
510	98.29
508	98.49
506	98.54
504	98.53
502	98.68
500	98.42
498	98.70
496	98.58
494	98.45

Wavelength (nm)	Transmission (%)
492	98.59
490	98.55
488	98.57
486	98.51
484	98.69
482	98.59
480	98.81
478	98.91
476	98.91
474	98.70
472	99.02
470	98.89
468	98.89
466	99.22
464	99.16
462	98.92
460	99.17
458	99.22
456	99.03
454	98.78
452	98.65
450	98.79
448	98.67
446	98.69
444	98.73
442	98.95
440	98.97
438	99.28
436	99.11
434	98.98
432	98.95

Wavelength (nm)	Transmission (%)
430	98.98
428	98.74
426	98.88
424	98.56
422	98.71
420	98.30
418	98.27
416	98.00
414	97.70
412	97.78
410	97.02
408	96.91
406	96.58
404	96.30
402	95.94
400	95.14
398	94.77
396	94.23
394	93.39
392	92.95
390	92.10
388	91.54
386	90.19
384	89.12
382	88.22
380	86.67
378	85.20
376	83.89
374	82.80

LP345 TRANSMISSION DATA (TYPICAL)

Wavelength (nm)	Transmission (%)
372	80.76
370	79.09
368	76.92
366	74.88
364	73.17
362	70.69
360	67.94
358	65.49
356	62.87
354	60.51
352	57.71
350	55.44
348	52.47
346	50.02
344	47.23
342	44.15
340	41.52
338	38.71
336	36.23
334	33.47
332	30.93
330	28.37
328	26.13
326	23.61
324	21.23
322	19.18
320	17.15
318	15.24
316	13.44
314	11.71
312	9.79

Wavelength (nm)	Transmission (%)
310	8.04
308	6.17
306	4.68
304	3.43
302	2.25
300	1.35
298	0.73
296	0.35
294	0.14
292	0.05
290	0.02
288	0.01
286	0.00
284	0.01
282	0.01
280	0.01
278	0.00
276	0.00
274	0.01
272	0.00
270	0.01
268	0.01
266	0.01
264	0.00
262	0.00
260	0.01
258	0.00
256	0.01
254	0.00
252	0.00
250	-0.00

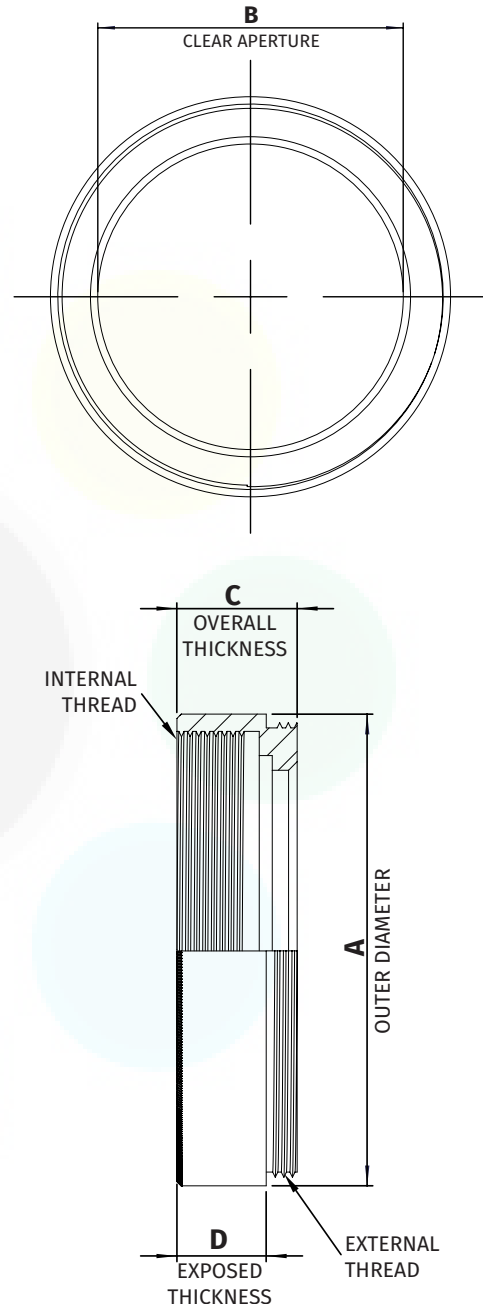
Wavelength (nm)	Transmission (%)
248	0.01
246	0.00
244	0.00
242	-0.00
240	0.01
238	-0.00
236	0.01
234	-0.01
232	0.01
230	0.01
228	-0.01
226	0.01
224	-0.00
222	-0.00
220	0.00
218	-0.00
216	-0.01
214	0.00
212	0.00
210	0.00
208	0.00
206	0.01
204	0.00
202	-0.01
200	-0.01

STANDARD THREADED MOUNT DIMENSIONS

NOTES:

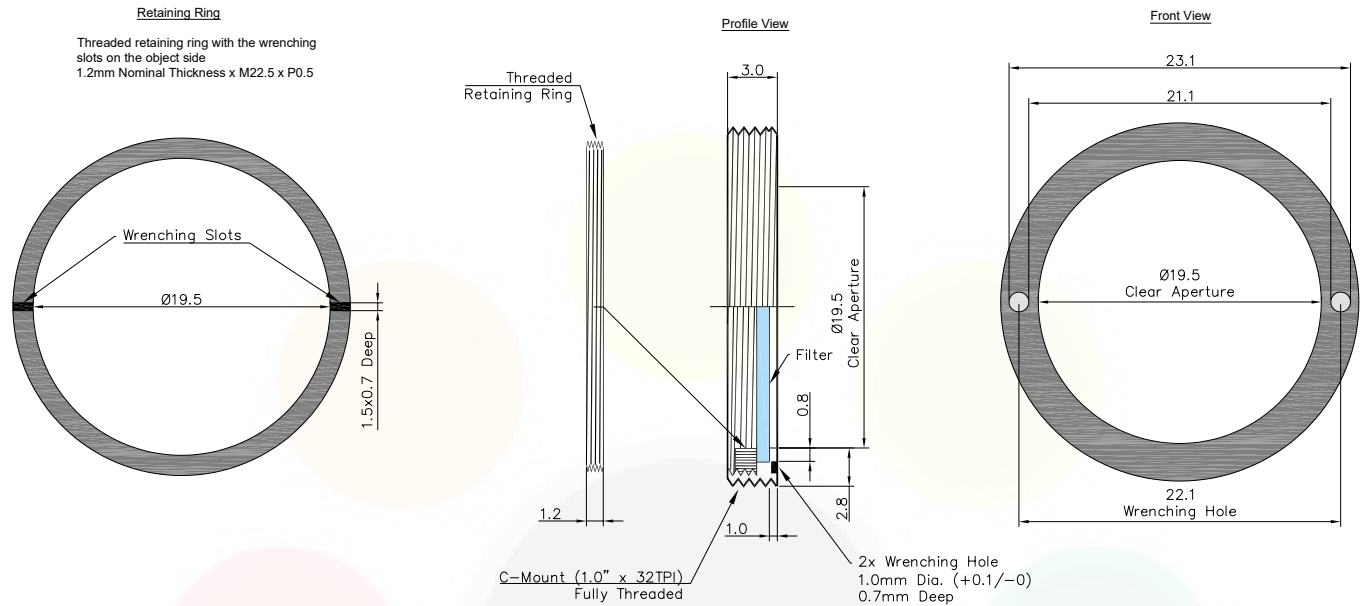
1. Inner and outer threads are of the same size and pitch.
2. Filter mount and retaining ring are black anodized aluminum.
3. All dimensions indicated in mm.
4. Tolerance: +/-0.3mm.

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



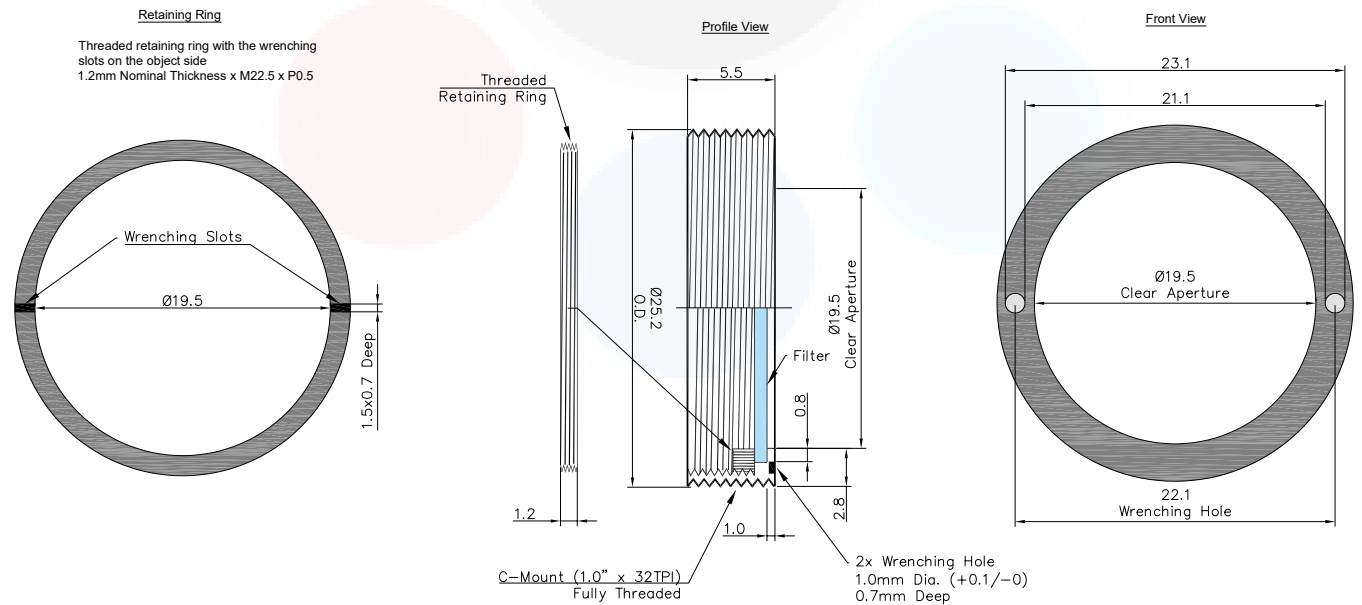
C-MOUNT DIMENSIONS (-25.4)

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.

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).

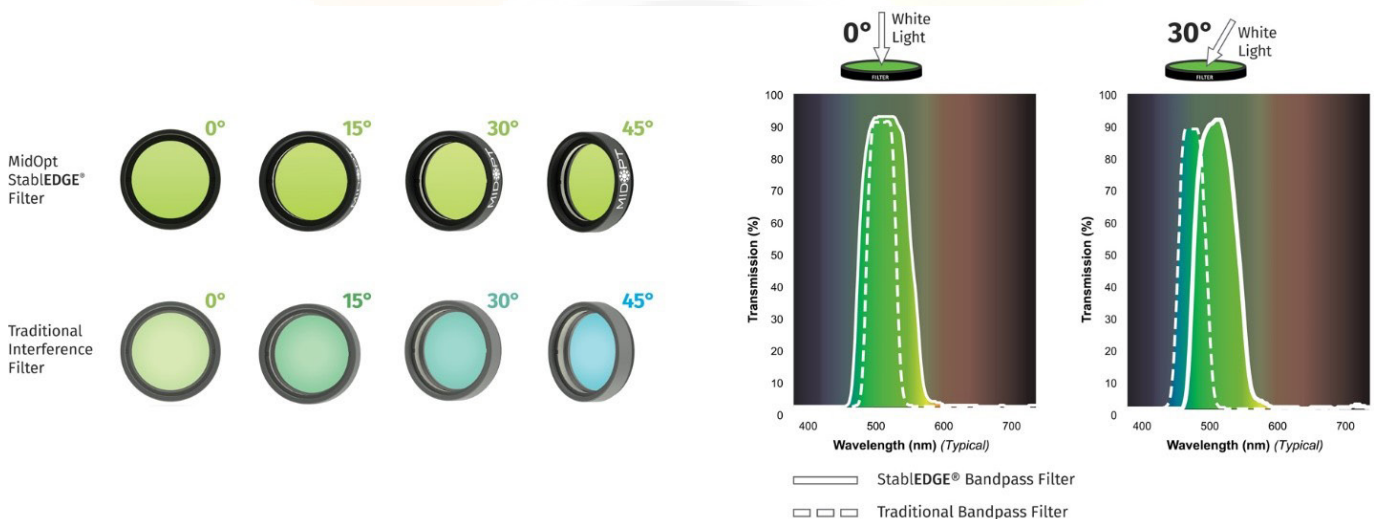


MIDOPT STABLEDGE®

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.

