Laser Coatings Catalog 2006

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Index

Amerina Optoelectronic Co. Ltd. is a leading technology provider of advanced optical coatings and components. The company's products cover the fields of Laser Optics, Projection Displays, Protection and Safety Optics, and OLED displays.

Amerina specializes in laser coatings. We provide our customers high performance optical coatings with high laser induced damage threshold (LIDT) for high power/energy applications of laser cutting, welding, and marking. Our coating products cover a broad optical spectrum ranging from 193nm to 10.6μm. With our dedicated R&D team and our affiliate optical manufacturers, we provide customers various high quality optical coatings and components for projection HDTV light engine systems and auto darkening welding helmet systems. In addition, Amerina extends its products and services into OLED displays industry.

Amerina's current production lines are:

Laser Optics---High performance laser coatings with high LIDT and wide wavelengths ranging from 193nm to 10.6μm, and various windows, waveplates, and polarizers for solid state lasers and CO_2 lasers.

Projection HDTV Light Engine Components---High quality straight and tapered light pipes, waveplates, UV-IR blockers, AR coating components for light engine systems.

Protection and Safety Optics---High quality optical interference filters, lens and the related components for auto-darkening welding helmets. The products quality meets the standard of CE, ANSI Z87.1.

Glass lids---Wet etched, sandblasted, and hot pressed glass lids with high precision and high mechanic strength for OLED encapsulation and chemical sensor encapsulation applications.

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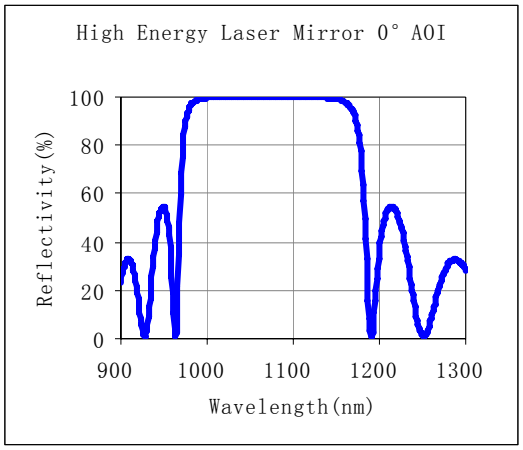
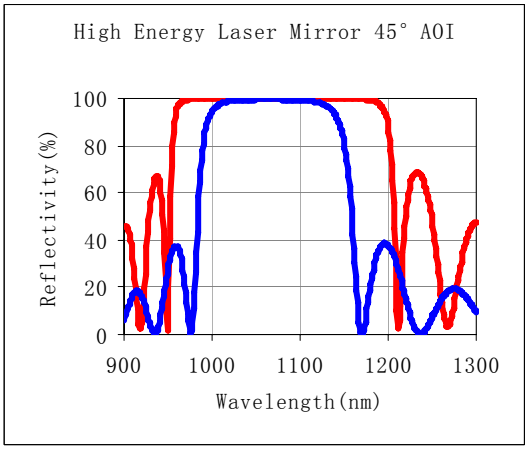
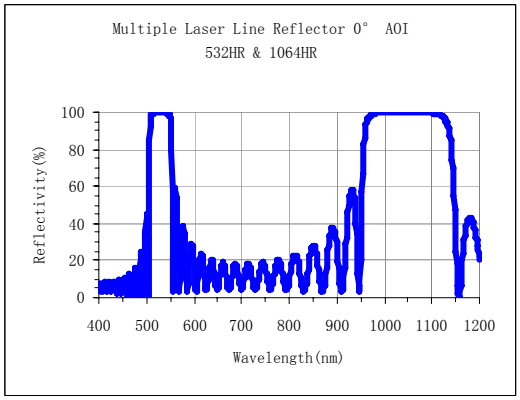
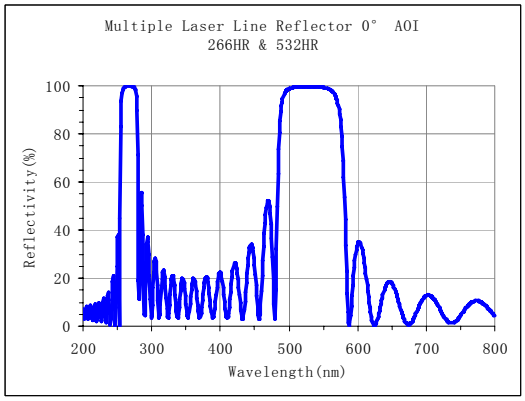
Laser Coatings

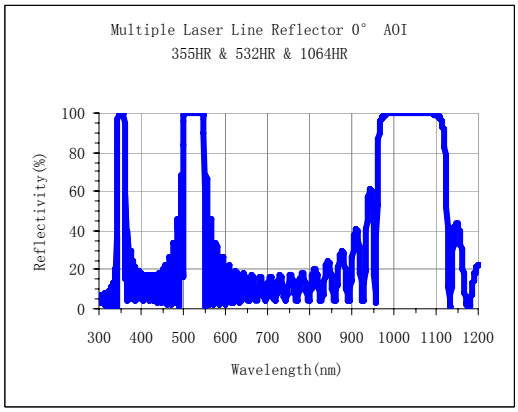
1. High Energy/Power Laser Mirrors











Specifications	
Substrate	UV grade fused silica, BK7
S1 Surface Figure	λ/10 typical at 633nm
S1 Surface Quality	10/5 laser quality
S2 Surface Quality	Commercial polish
Chamfer	0.25mm at 45° typical
Coating Technology	Electron beam evaporation, dielectric multilayers
Incident Angle	0° or 45°
Clear Aperture	> 85% of diameter
Laser-Induced Damage Threshold	>10J/cm^2 (1.06μm, 1ns)

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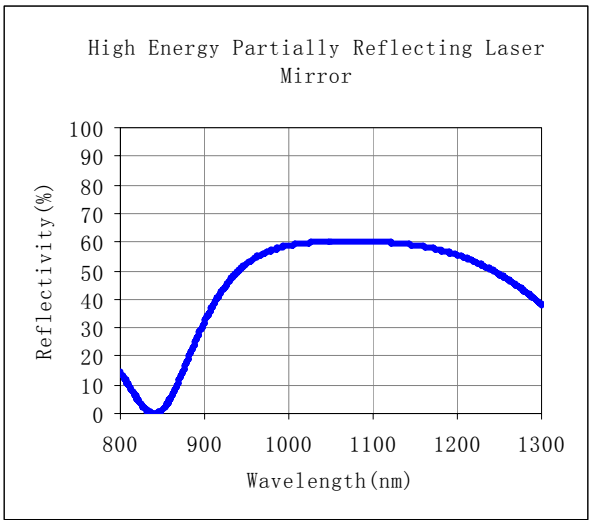
Part No.	Diameter(mm)	Wavelength(nm)
HR-S-0-01-A/B/C	20/25.4/30	308
HR-S-0-02-A/B/C	20/25.4/30	532
HR-S-0-03-A/B/C	20/25.4/30	632.8
HR-S-0-04-A/B/C	20/25.4/30	780
HR-S-0-05-A/B/C	20/25.4/30	1064
HR-S-0-06-A/B/C	20/25.4/30	1315
HR-S-0-07-A/B/C	20/25.4/30	10.6μm
HR-D-0-01-A/B/C	20/25.4/30	266/532
HR-D-0-02-A/B/C	20/25.4/30	351/1053
HR-D-0-03-A/B/C	20/25.4/30	532/1064
HR-D-0-04-A/B/C	20/25.4/30	632.8/1064

Note: Other dimension and specification are available upon request.

2. High Energy/Power Partially Reflecting Laser Mirrors



Specifications	
Substrate Material	UV Grade Fused Silica or BK7
Surface Figure	λ/10 typical at 633nm
Transmitted wavefront distortion	λ/10 typical at 633nm
Surface Quality	10/5 laser quality
Diameter Tolerance	+0.0mm~-0.25mm
Thickness Tolerance	±0.25mm
Wedge	≤5 minutes
Chamfer	0.25mm at 45° typical
Concentricity	≤0.05mm
Radius Tolerance	±0.5%
Coating Technology	Electron Beam Evaporation, Dielectric Mulitlayers
Adhesion and Durability	Per MIL-C-675A. Insoluble in lab solvents
Clear Aperture	>85% of dimension
Angle of Incidence	0°
Laser Induced Damage Threshold	10J/cm^2, 1064nm, 1 ns pulse

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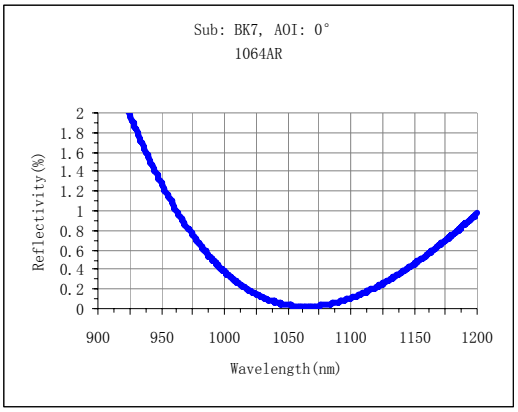
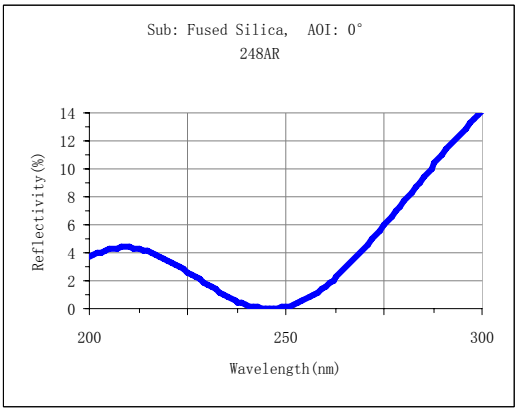
Wavelength available for the high energy partially reflecting laser mirrors. (nm)
248, 266, 308, 337, 355, 364, 488, 515, 527, 532, 589, 633, 670, 694, 755, 780, 800, 830, 850, 940, 1047, 1053, 1064, 1235, 1319, 1550, 2010, 2100
Reflectance (%)
10±3.0, 20±4.0, 30±5.0, 40±5.0, 50±5.0, 60±4.0, 70±4.0, 75±4.0, 80±3.0, 90±2.0, 95±1.5, 98±1.0,99±0.5
Substrate Diameter(mm)
10, 12.7, 15, 20, 25, 25.4, 30

3. Antireflection Coatings

A. V-Type Antireflection Coatings

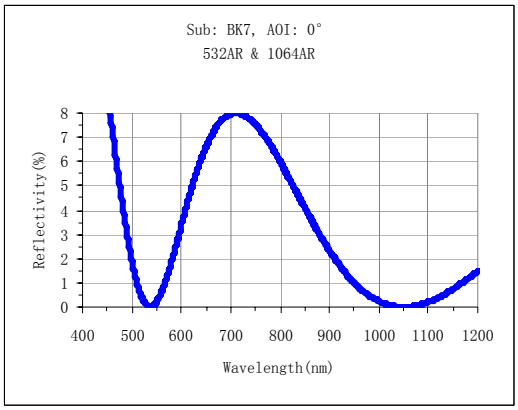


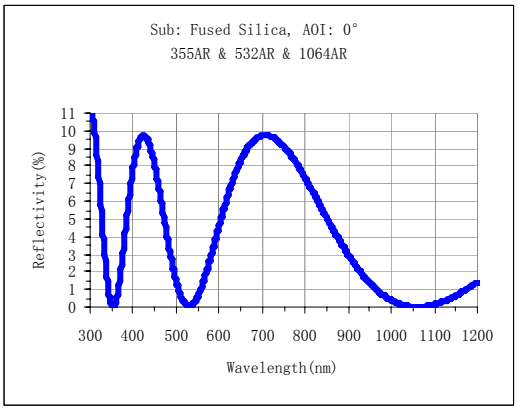


Specifications	
Substrate	UV grade fused silica, BK7, Nd:YAG
Surface Figure	< λ/10 @ 633nm
Surface Quality	10/5 laser quality
Chamfer	0.25mm at 45° typical
Coating Technology	Electron beam evaporation, dielectric multilayers
Incident Angle	0°
Diameters(mm)	10, 12.7, 15, 20, 25.4, 30
Thickness(mm)	3~6.25
Clear Aperture	> 85% of diameter
Laser-Induced Damage Threshold	>5J/cm^2 (1.06μm, 1ns)

Part No.	Wavelength(nm)	Residual Reflectance
AR-S-00	193	<0.5%
AR-S-01	248	<0.5%
AR-S-02	355	<0.3%
AR-S-03	532	<0.2%
AR-S-04	632.8	<0.2%
AR-S-05	670	<0.2%
AR-S-06	780	<0.2%
AR-S-07	808	<0.2%
AR-S-08	1030	<0.2%
AR-S-09	1053	<0.2%
AR-S-10	1064	<0.2%
AR-S-11	1310	<0.15%
AR-S-12	1550	<0.15%

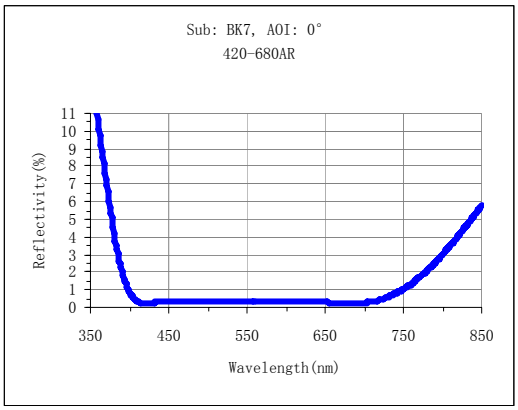
B. Double-V Antireflection Coatings





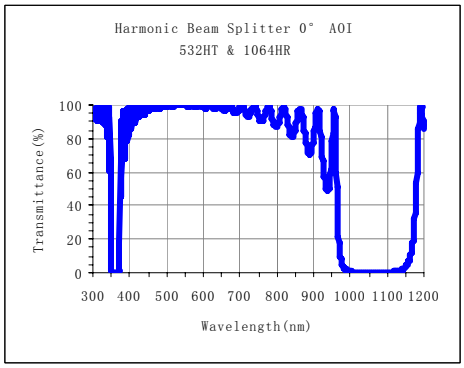
Specifications		
Substrate	UV grade fused silica, BK7	
Surface Figure	< λ/10 @ 633nm	
Surface Quality	10/5 laser quality	
Chamfer	0.25mm at 45° typical	
Coating Technology	Electron beam evaporation, dielectric multilayers	
Incident Angle	0°	
Clear Aperture	> Central 85% of diameter	
Part No.	**Wavelength(nm)**	**Residual Reflectance**
AR-D-01	263/351	0.5%/0.3%
AR-D-02	266/532	0.5%/0.3%
AR-D-03	351/1053	0.5%/0.3%
AR-D-04	373/745	0.5%/0.3%
AR-D-05	532/800	0.5%/0.3%
AR-D-06	532/1064	0.5%/0.3%
AR-D-07	1064/1535	0.3%/0.3%
AR-D-08	792/2060	1%/0.5%

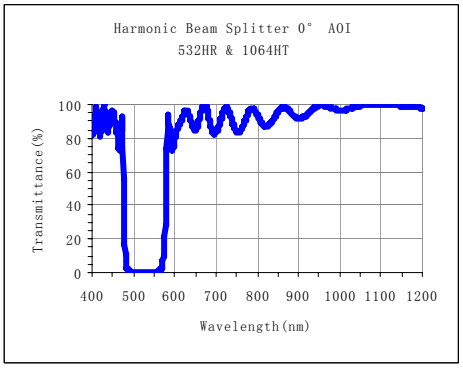
C. Broadband Antireflection Coatings



Specifications		
Substrate	UV grade fused silica, BK7	
Surface Figure	< λ/10 @ 633nm	
Surface Quality	40-20	
Chamfer	0.25mm at 45° typical	
Coating Technology	Electron beam evaporation, dielectric multilayers	
Incident Angle	0°	
Clear Aperture	> Central 85% of diameter	
Part No.	**Wavelength Range(nm)**	**Residual Reflectance**
AR-B-01	420-670	<0.5%
AR-B-02	800-980	<0.4%
AR-B-03	1565-1610	<0.2%

4. High Energy/Power Harmonic Laser Beam splitters





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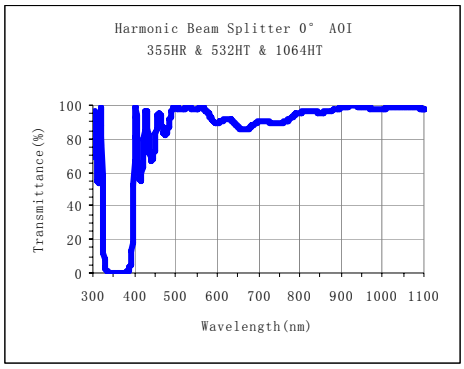
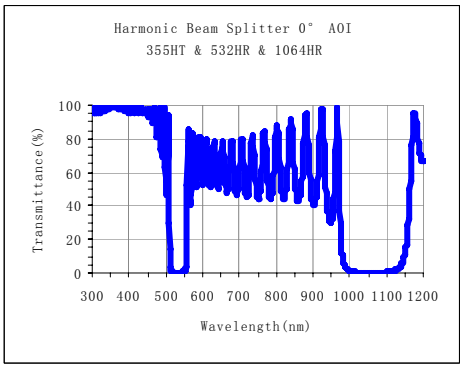
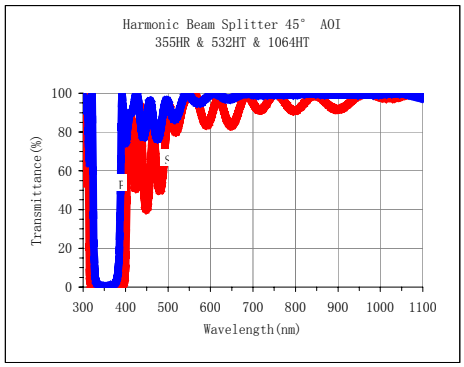
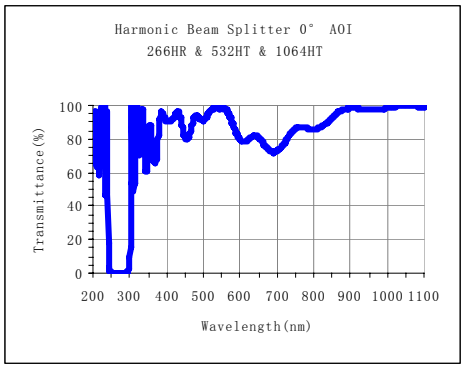
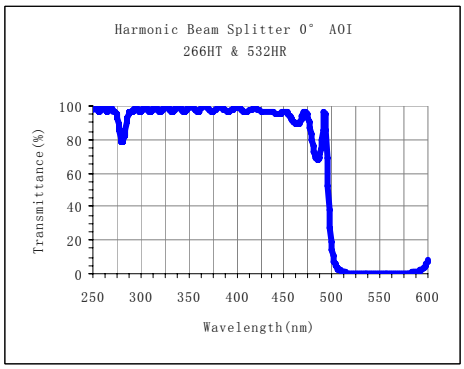








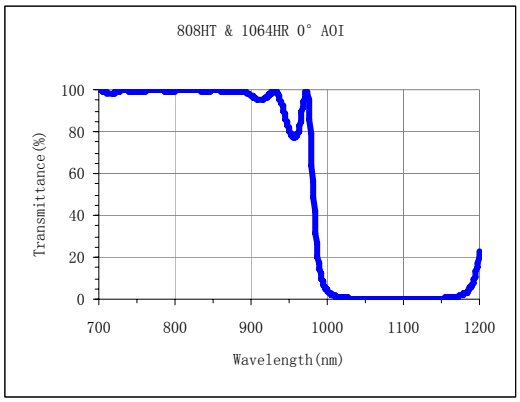


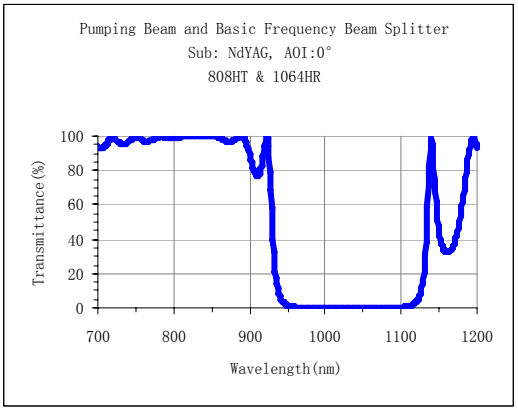
Specifications	
Substrate Material	UV Grade Fused Silica or BK7
Surface Figure	λ/10 typical at 633nm
Transmitted wavefront distortion	λ/10 typical at 633nm
Surface Quality	10/5 laser quality
Diameter Tolerance	+0.0mm~-0.25mm
Thickness Tolerance	±0.25mm
Wedge	≤5 minutes
Chamfer	0.25mm at 45° typical
Concentricity	≤0.05mm
Radius Tolerance	±0.5%
Coating Technology	Electron Beam Evaporation, Dielectric Mulitlayers
Adhesion and Durability	Per MIL-C-675A. Insoluble in lab solvents
Clear Aperture	>85% of dimension
Angle of Incidence	0° or 45°
Wavelength Range	248~2100nm
Transmittance	>95%
Reflectance	>99.5%
Laser Induced Damage Threshold	10J/cm^2, 1 ns pulse, at 1064nm typical

Substrate Diameter(mm)
10, 12.7, 15, 20, 25, 25.4, 30

Note: Other dimension and specification are available upon request.

5. Pumping beam and basic frequency beam splitters



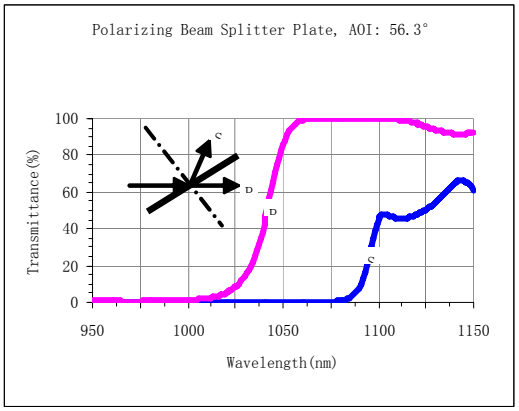


Specifications	
Substrate Material	UV Grade Fused Silica or BK7 or Nd:YAG laser crystal
Surface Figure	λ/10 typical at 633nm
Transmitted wavefront distortion	λ/10 typical at 633nm
Surface Quality	10/5 laser quality
Diameter Tolerance	+0.0mm~-0.25mm
Thickness Tolerance	±0.25mm
Wedge	≤5 minutes
Chamfer	0.25mm at 45° typical
Concentricity	≤0.05mm
Radius Tolerance	±0.5%
Coating Technology	Electron Beam Evaporation, Dielectric Mulitlayers
Adhesion and Durability	Per MIL-C-675A. Insoluble in lab solvents
Clear Aperture	>85% of dimension
Angle of Incidence	0°
Wavelength Range	248~2100nm
Transmittance	>97%
Reflectance	>99.8%
Laser Induced Damage Threshold	5J/cm^2, 1 ns pulse, at 1064nm typical
Substrate Diameter(mm)	
10, 12.7, 15, 20, 25, 25.4, 30	

Note: Other dimension and specification are available upon request.

6. Polarizing beam splitters

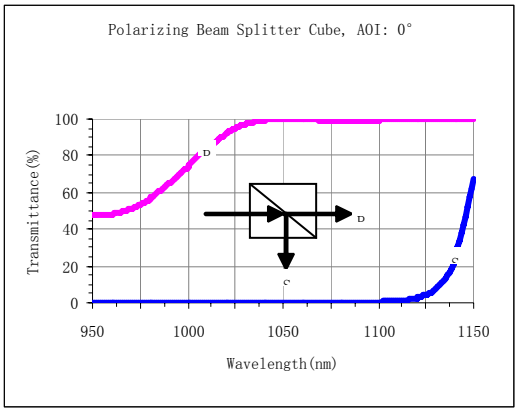
Polarization beam splitter plate



Specifications	
Substrate	UV grade fused silica, BK7
Surface Figure	< λ/10 @ 633nm
Surface Quality	10/5 laser quality
Chamfer	0.25mm at 45° typical
Coating Technology	Electron beam evaporation, dielectric multilayers
Clear Aperture	> 85% of diameter
Incident Angle	56.3°±3°
Wavelength Range	Visible, Near Infrared
Polarizing Transmission	Tp≥97%; Ts<0.5%
Extinction Ratio	Tp/Ts>100:1
Laser-Induced Damage Threshold	>5J/cm^2 (1.06μm, 1ns)

Part No.	Diameter(mm)	Wavelength(nm)
PBS-P-01-A/B/C	20/25.4/30	780
PBS-P-02-A/B/C	20/25.4/30	1064
PBS-P-03-A/B/C	20/25.4/30	1310
PBS-P-04-A/B/C	20/25.4/30	1550

Polarization beam splitter cube

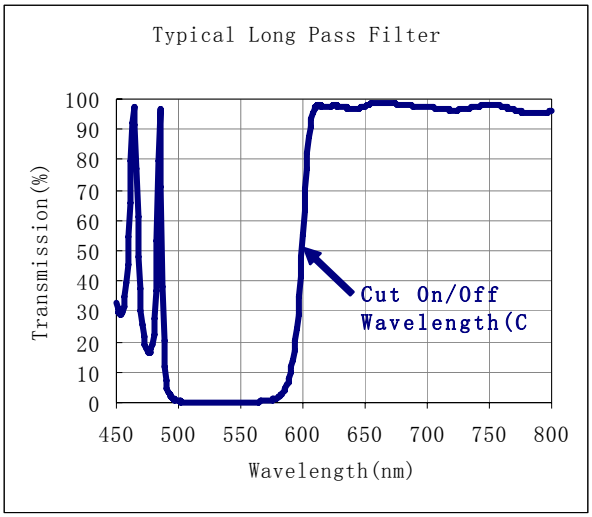


Specifications		
Substrate	UV grade fused silica, BK7	
Surface Figure	< λ/10 @ 633nm	
Surface Quality	40-20	
Chamfer	0.25mm at 45° typical	
Coating Technology	Electron beam evaporation, dielectric multilayers	
Clear Aperture	> Central 85% of diameter	
Incident Angle	0° ±2°	
Polarizing Transmission	Tp≥98%; Ts≤0.2%	
Extinction Ratio	Tp/Ts>500:1	
AR Coating	R<0.25%, Each Exterior Surface	
Part No.	**Dimension(mm)**	**Wavelength(nm)**
PBS-C-S-01	12.7×12.7×12.7 15×15×15 20×20×20 25.4×25.4×25.4 30×30×30	488
PBS-C-S-02		532
PBS-C-S-03		633
PBS-C-S-04		780
PBS-C-S-05		830
PBS-C-S-06		852
PBS-C-S-07		1064
PBS-C-S-08		1310
PBS-C-S-09		1550

Note: Other dimension and specification are available upon request.

7. Edge filters

A. Long Pass Filters



Specifications	
Substrate material	UV Grade Fused Silica or BK7
Diameter	25.0 +0~-.025 mm
Thickness	3 ± 0.5 mm
Min. clear aperture	>85% of diameter
Transmission	>90% average within specified range
Attenuation	>99% average within specified range
Angle of incidence	0° ± 5°
Coating Technology	Electron beam evaporation, dielectric multilayers
Surface quality	20/10 per MIL-O-13830B
Coating quality	40/20 per MIL-O-13830B
Wedge	<3 minutes
Wavefront distortion	≤1λ @ 633nm per 25mm
Humidity resistance	Per MIL-C-675A
Abrasion resistance	Per MIL-C-675A
Optimum temperature	23°C
Temperature limits	-50°C to 100°C
Certification	Spectrophotometer print of lot sample
Cleaning	Non-abrasive method, isopropyl alcohol on lens tissue recommended
Laser Induced Damage Threshold(LIDT)	>10J/cm^2 (1.06μm, 1ns)

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Part No.	COWL (nm)	Attenuation Range (nm)	Wavelength at 50% T (nm)	Transmission Range (nm)
VIS-LPF400	400	340-380	400 ±10	440-1320
VIS-LPF450	450	380-430	450 ±10	495-1485
VIS-LPF500	500	425-475	500 ±10	550-1650
VIS-LPF550	550	470-525	550 ±10	605-1815
VIS-LPF600	600	515-575	600 ±10	660-1980
VIS-LPF650	650	550-620	650 ±10	715-2145
VIS-LPF700	700	600-670	700 ±10	770-2200
NIR-LPF750	750	640-715	750 ±10	825-2200
NIR-LPF800	800	685-760	800 ±10	880-2200
NIR-LPF850	850	725-810	850 ±10	935-2200
NIR-LPF900	900	770-860	900 ±10	990-2200
NIR-LPF950	950	810-910	950 ±10	1045-2200
NIR-LPF1000	1000	855-955	1000 ±10	1100-2200
NIR-LPF1100	1100	930-1050	1100±10	1150-2200
NIR-LPF1200	1200	1020-1150	1200±10	1250-2200
NIR-LPF1300	1300	1110-1250	1300±10	1350-2200
NIR-LPF1400	1400	1200-1350	1400±10	1450-2200
NIR-LPF1500	1500	1290-1450	1500±10	1550-2200

Note: Other dimension and specification are available upon request.

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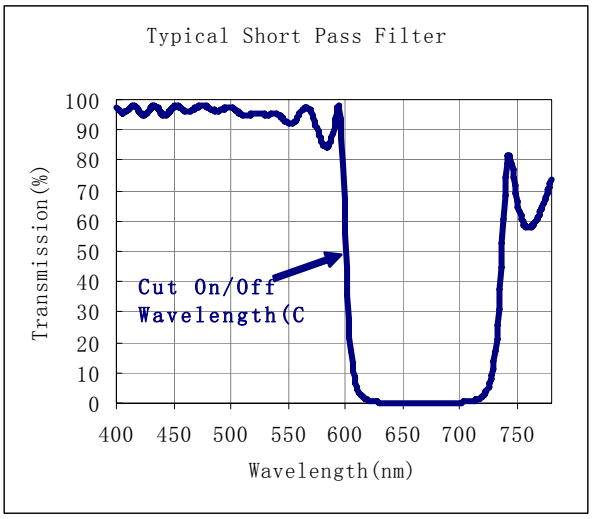
B. Short Pass Filters



Specifications	
Substrate material	UV Grade Fused Silica or BK7
Diameter	25.0 +0~-.025 mm
Thickness	3 ± 0.5 mm
Min. clear aperture	>85% of diameter
Transmission	>90% average within specified range
Attenuation	>99% average within specified range
Angle of incidence	0° ± 5°
Coating Technology	Electron beam evaporation, dielectric multilayers
Surface quality	20/10 per MIL-O-13830B
Coating quality	40/20 per MIL-O-13830B
Wedge	<3 minutes
Wavefront distortion	≤1 λ @ 633nm per 25mm
Humidity resistance	Per MIL-C-675A
Abrasion resistance	Per MIL-C-675A
Optimum temperature	23°C
Temperature limits	-50°C to 100°C
Certification	Spectrophotometer print of lot sample
Cleaning	Non-abrasive method, isopropyl alcohol on lens tissue recommended
Laser Induced Damage Threshold(LIDT)	>10J/cm2 (1.06μm, 1ns)

Part No.	COWL (nm)	Transmission Range (nm)	Wavelength at 50% T (nm)	Attenuation Range (nm)
40-0001	450	305-425	450 ±10	475-530
40-0006	500	340-475	500 ±10	525-600
40-0011	550	375-520	550 ±10	575-650
40-0016	600	400-565	600 ±10	630-720
40-0021	650	400-615	650 ±10	680-760
40-0026	700	400-660	700 ±10	735-835
40-0031	750	400-710	750 ±10	790-885
40-0036	800	400-755	800 ±10	840-940
40-0041	850	400-805	850 ±10	895-1000
40-0047	900	400-850	900 ±10	945-1060
40-0052	950	400-900	950 ±10	1000-1125
40-0057	1000	400-945	1000 ±10	1050-1180

Note: Other dimension and specification are available upon request.

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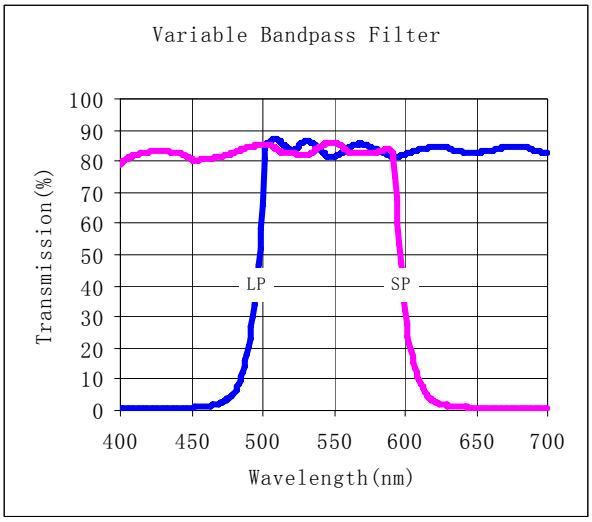
C. Variable Bandpass Filters

Broad bandpass filter

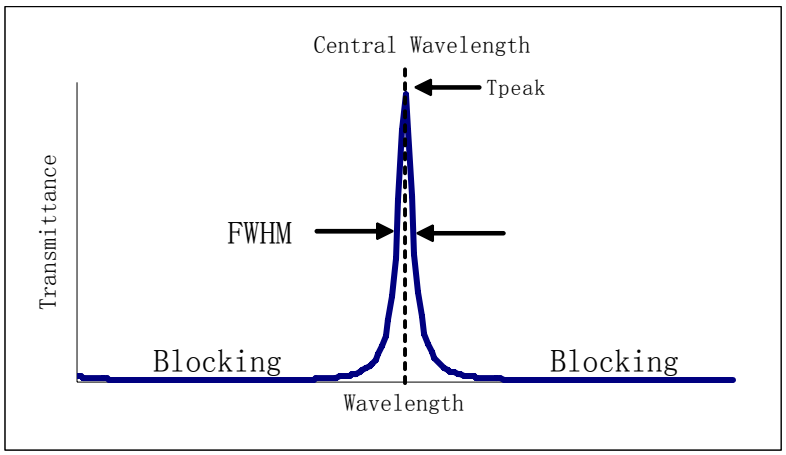


A long pass filter and a short pass filter fastened together to create a variable bandpass filter with an bandwidth from 20nm to 100nm. The center wavelength allows to be adjusted by combining different long pass filter and short pass filters.

Specifications	
Substrate material	UV Grade Fused Silica or BK7
Diameter	25.0 +0~-.025 mm
Thickness	3 ± 0.5 mm
Min. clear aperture	>85% of diameter
Transmission	>90% average within specified range
Attenuation	>99% average within specified range
Angle of incidence	0° ± 5°
Coating Technology	Electron beam evaporation, dielectric multilayers
LPF Blockings	From 80% of cut-on λ to X-ray with the O.D. of 3
SPF Blockings	From 120% of cut-off λ to 1200nm(typical) with the O.D. of 3
Surface quality	20/10 per MIL-O-13830B
Coating quality	40/20 per MIL-O-13830B
Wedge	<3 minutes
Wavefront distortion	≤1 λ @ 633nm per 25mm
Humidity resistance	Per MIL-C-675A
Abrasion resistance	Per MIL-C-675A
Optimum temperature	23°C
Temperature limits	-50°C to 100°C
Certification	Spectrophotometer print of lot sample
Cleaning	Non-abrasive method, isopropyl alcohol on lens tissue recommended

Note: the Other dimension and specification are available upon request.

Narrow bandpass filter



Specifications	
Substrate material	UV Grade Fused Silica or BK7
Diameter	25.0 +0~-.025 mm
Thickness	3 ± 0.5 mm
Min. clear aperture	>90% of diameter
Tpeak	>35%
Attenuation	T<0.01%
Angle of incidence	0° ± 5°
Coating Technology	Electron beam evaporation, dielectric multilayers, or metal induced interference filter
Surface quality	20/10 per MIL-O-13830B
Wedge	<3 minutes
Wavefront distortion	≤1 λ @ 633nm per 25mm
Humidity resistance	Per MIL-C-675A
Abrasion resistance	Per MIL-C-675A
Optimum temperature	23°C
Temperature limits	-50°C to 100°C
Certification	Spectrophotometer print of lot sample
Cleaning	Non-abrasive method, isopropyl alcohol on lens tissue recommended
Wavelength(nm)	355, 405, 488, 514, 532, 633, 780, 850, 1064