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TECHSPEC® **Prisms**

TECHSPEC® **Filters**

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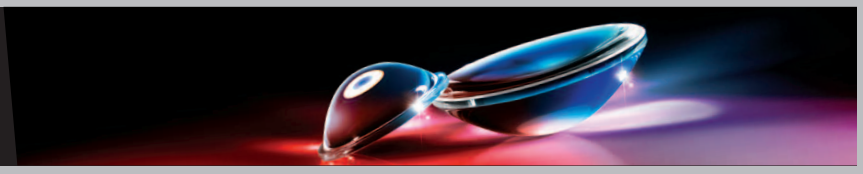
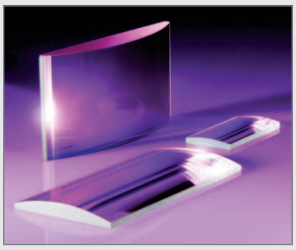
LENSES



PLANO-CONVEX (PCX) AND DOUBLE-CONVEX (DCX) LENSES

Plano-Convex lenses feature a positive focal length and have one flat and one convex surface. They are ideal for collimation and focusing applications utilizing monochromatic illumination. Double-Convex lenses feature a positive focal length and have 2 convex surfaces with equal radii. They are recommended for image relay, and for imaging of objects at close conjugates.

PLANO CONVEX (PCX) AND DOUBLE-CONVEX (DCX) LENSES				
	Size Range	Focal Length Range	Wavelength Range	Coating Options
Standard PCX and DCX Lenses	1 - 75mm	0.6 - 750mm	0.4 - 1.6µm	Uncoated or 5 AR Options
Laser PCX Lenses	6 - 50mm	6 - 750mm	0.2 - 2.2µm	Uncoated or 11 AR Options
UV Fused Silica PCX Lenses	6 - 50mm	9 - 400mm	0.2 - 2.2µm	Uncoated or 4 AR Options
Calcium Fluoride (CaF_2) PCX Lenses	12.7 - 50.8mm	25 - 1000mm	0.3 - 7.0µm	Uncoated
Silicon (Si) PCX Lenses	25mm	25 - 250mm	1.2 - 7.0µm	Uncoated
Germanium (Ge) PCX Lenses	25 - 50mm	25 - 250mm	2.0 - 16.0µm	Uncoated or 3 AR Options
Zinc Selenide (ZnSe) PCX Lenses	12.7 - 50.8mm	12.7 - 500mm	0.6 - 16.0µm	Uncoated
Sapphire (Al_2O_3) PCX Lenses	12.7 - 25.4mm	25.4 - 500mm	0.2 - 5.5µm	Uncoated



CYLINDER LENSES

Cylinder lenses have one flat and one cylindrical surface. They can have either positive or negative focal lengths. They are typically used to focus incoming light to a line, or to change the aspect ratio of an image.

CYLINDER LENSES				
	Size Range	Focal Length Range	Wavelength Range	Coating Options
PCX Cylinder Lenses	5 - 50 x 25mm	6 - 150mm	0.4 - 1.6µm	Uncoated or 4 AR Options
PCV Cylinder Lenses	6.25 - 25 x 50mm	-6.25 to -150mm	0.4 - 1.6µm	Uncoated or 4 AR Options
Achromatic Cylinder Lenses	12.5mm	25 - 100mm	0.4 - 1.0µm	MgF_2 Coated
UV Fused Silica Cylinder Lenses	12.5 - 25.mm	25 - 150mm	0.2 - 2.2µm	Uncoated or 1 AR Options
Plastic Hybrid Acylinder Lenses	25mm	20 - 50mm	0.4 - 1.6µm	Uncoated or VIS Coated

ACHROMATIC DOUBLET LENSES

Achromatic lenses consist of 2 optical components cemented together to reduce or eliminate spherical and chromatic aberration. Achromatic lenses will provide smaller spot sizes and superior image quality than a comparable singlet lens.

ACHROMATIC DOUBLET LENSES				
	Size Range	Focal Length Range	Wavelength Range	Coating Options
Standard Achromatic Lenses	1 - 128mm	1.5 - 1900mm	0.4 - 1.0µm	MgF_2, VIS 0° or VIS-NIR
Negative Achromatic Lenses	6.25 - 40mm	-7.5 to -150mm	0.4 - 0.7µm	MgF_2, VIS 0° or VIS-NIR
Near Infrared Achromatic Lenses	6 - 50mm	9 - 200mm	0.7 - 1.6µm	NIR II or SWIR
Near UV Achromatic Lenses	6.25 - 50mm	12.5 - 125mm	0.3 - 0.7µm	BBAR for 350 - 700nm
Aspherized Achromatic Lenses	9 - 25mm	12 - 50mm	0.4 - 0.7µm	MgF_2, or VIS 0°
Triplet Achromatic Lenses	6.25 - 25mm	10 - 50mm	0.4 - 0.7µm	MgF_2
Ultraviolet Triplet Achromatic Lenses	30mm	36 - 180mm	0.2 - 2.2µm	Uncoated of MgF_2
Mid Wave IR Achromatic Lenses	30mm	40 - 75mm	3.0 - 5.0µm	BBAR for 3 - 5µm
Long Wave IR Achromatic Lenses	30mm	40 - 75mm	8.0 - 12.0µm	BBAR for 8 - 12µm

ASPHERIC LENSES

Aspheric Lenses feature one surface whose radius changes with distance from the optical axis. This unique feature allows aspheric lenses to eliminate spherical aberration and greatly reduce other aberrations when compared to a simple spherical lens, delivering improved optical performance.

ASPHERIC LENSES				
	Size Range	Focal Length Range	Wavelength Range	Coating Options
Precision Aspheric Lenses	15 - 50mm	9 - 50mm	0.4 - 1.6µm	Uncoated or 2 AR Options
UV Fused Silica Aspheric Lenses	15 - 50mm	12.5 - 60mm	0.2 - 2.2µm	Uncoated or 4 AR Options
Achromatic Aspheric Lenses	9 - 25mm	12 - 50mm	0.4 - 0.7µm	MgF_2 or VIS Coated
Small Diameter Aspheric Lenses	1.8 - 11mm	0.7 - 22mm	0.4 - 1.6µm	Uncoated or 4 AR Options
Plastic Aspheric Lenses	12 - 25mm	9 - 75mm	0.4 - 1.2µm	Uncoated or 2 AR Options
Germanium (Ge) Aspheric Lenses	25mm	12.5 - 100mm	2.0 -16.0µm	Uncoated or 2 AR Options
Zinc Selenide (ZnSe) Aspheric Lenses	25.4 - 50.8mm	12.7 - 50.8mm	0.6 - 16.0µm	Uncoated
Aspheric Cylinder Lenses	25mm	20 - 50 mm	0.4 - 1.6µm	Uncoated or VIS Coated

FILTERS

BANDPASS INTERFERENCE FILTERS

Bandpass Filters selectively transmit a portion of the spectrum, while rejecting all other wavelengths. Our Bandpass Interference Filters are available in a variety of bandwidth options. Laser-Line filters will typically have narrow (2 - 5nm) bandwidths. Fluorescence Filters have been specially designed to maximize the energy of the excitation and emission bands, and will thus have fairly broad (20 - 70nm) bandwidths. Our selection of 10nm filters for chemical, environmental, and elemental analysis is among the largest in the world. Traditionally coated evaporated filters offer excellent value, whereas hard coated filters offer increased performance and exceptional durability. Interference Filters are angle sensitive, so care should be taken when mounting and integrating into an optical system.

BANDPASS INTERFERENCE FILTERS	Center Wavelength Range	Size Range
Fluorescence Bandpass Filters	340 - 832nm	12.5 - 50mm
Hard Coated Bandpass Filters	337 - 1550nm	12.5 - 50mm
Traditional Coated Bandpass Filters	193nm - 5.3µm	12.5 - 50mm
Laser Line Clean-Up Filters	193 - 1550nm	12.5 - 50mm

NOTCH FILTERS

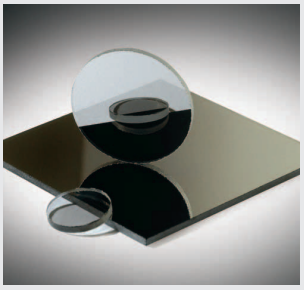
Notch Filters selectively reject a portion of the spectrum, while transmitting all other wavelengths. Featuring dielectric coatings to reflect the laser wavelength, Notch Filters are available with different levels of blocking and transmission ranges to provide customers options on performance and value.

NOTCH FILTERS	Center Wavelength Range	Size Range
OD6 Notch Filters	405 - 1064nm	12.5 - 50mm
OD4 Notch Filters	355 - 1064nm	12.5 - 50mm

EDGE AND DICHROIC FILTERS

Longpass Filters transmit wavelengths greater than the cut-on wavelength, while Shortpass Filters transmit wavelengths shorter than the cut-off wavelength. Dichroic Filters perform the same function, while guaranteeing that the rejected wavelengths are reflected.

EDGE AND DICHROIC FILTERS	Cut-On/Off Wavelength Range	Size Range
Longpass Filters	266nm - 7.3µm	12.5 - 50mm
Shortpass Filters	400 - 1600nm	15 - 60mm
Fluorescence Dichroic Filters	409 - 801nm	12.5 - 25.2 x 35.6mm
Dichroic Color Filters	400 - 900nm	12.5 - 50 x 50mm
Variable Edge Filters	300 - 845nm	15 - 60mm
Hot and Cold Mirrors	N/A	12.5 - 101 x 127mm
Color Glass Lonpass Filters	285 - 1000nm	12.5 - 50 x 50mm



NEUTRAL DENSITY FILTERS

Neutral Density (ND) Filters are designed to reduce transmission evenly across a portion of the spectrum. They perform this function by either absorbing or reflecting the portion of the light that is not transmitted. They can be designed for any portion of the UV, VIS or IR spectrum, and are commonly used to prevent over exposure of cameras and other detectors.

EDGE AND DICHROIC FILTERS	Wavelength Range	Size Range
Reflective ND Filters	UV, VIS, NIR, and IR	12.5 - 50mm
Absorptive ND Filters	VIS	12.5 - 50 x 50mm
ND Filter Film	VIS	12.5 - 100 x 300mm
Circular and Linear Variable ND Filters	VIS	25 - 100mm

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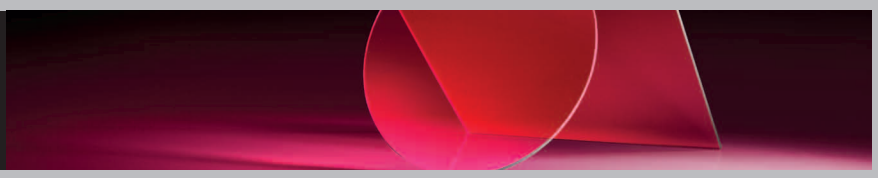
WINDOWS

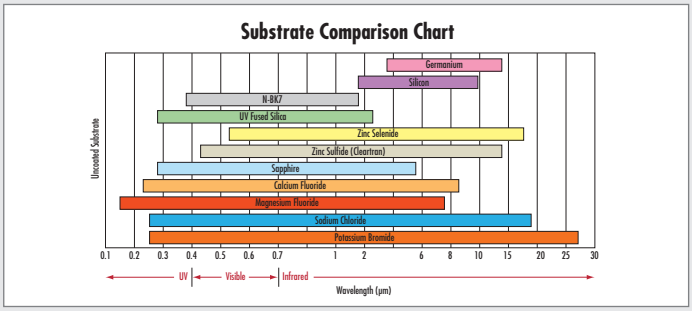


- Understanding your Application Dictates Substrate Selection
- Wide Selection of Substrates and Coatings for UV, Visible and Infrared Applications
- Laser Line and Broadband AR Coatings Available

CALCIUM AND MAGNESIUM FLUORIDE

Applications:
- Low absorption and high damage threshold from 0.2 - 7µm
- Spectroscopy, semiconductor processing and cryogenically cooled thermal imaging

EO Advantage:
- 5 - 50mm sizes
- ½λ surface accuracy
- <1arcmin parallelism



FUSED SILICA

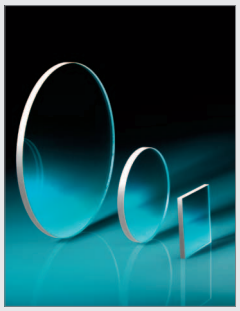
Applications:
- Low coefficient of thermal expansion and excellent transmission from UV to IR
- Interferometry, laser instrumentation, spectroscopy and industrial applications

EO Advantage:
- 5 - 50mm sizes (UV grade) and 1" - 8" sizes (standard)
- UV, excimer and standard grade substrate
- High power laser line and broadband AR coatings

SILICON

Applications:
- Low cost and low density substrate for weight sensitive IR applications
- Spectroscopy, mid IR laser systems, THz imaging

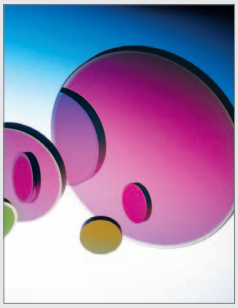
EO Advantage:
- 10 - 50mm sizes
- Optical grade substrate
- <3arcmin parallelism
- 3 - 5µm AR coating



N-BK7

Applications:
- Low-cost substrate for visible and NIR applications
- Machine vision, microscopy, industrial applications

EO Advantage:
- 5 - 75mm sizes
- <1arcmin parallelism
- MgF_2, VIS 0°, VIS-NIR, and NIR I broadband coating options
- 7 Laser Line coatings between 405 and 1550nm



GERMANIUM

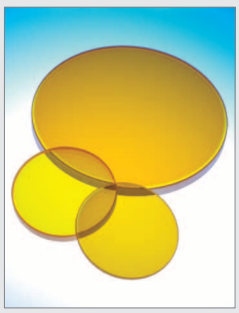
Applications:
- High index of refraction and knoop hardness with transmission in the mid and long wave IR
- Thermal imaging, FLIR and rugged IR applications

EO Advantage:
- 10 - 75mm diameter sizes
- 1/20λ @ 10.6µm surface accuracy
- <1arcmin parallelism
- 3 - 12µm and 8 - 12µm AR coating options

SAPPHIRE

Applications:
- Extremely hard and durable with good transmission from UV to IR
- IR laser systems, spectroscopy and rugged environmental equipment

EO Advantage:
- 2.5 - 75mm diameter sizes
- <3.5arcmin parallelism
- Metalized options available



ZINC SELENIDE AND ZINC SULFIDE

Applications:
- Low absorption coefficient and high resistance to thermal shock
- CO_2 laser systems and thermal imaging

EO Advantage:
- 10 - 75mm diameter sizes
- 1/20λ @ 10.6µm surface accuracy
- Broadband AR coatings

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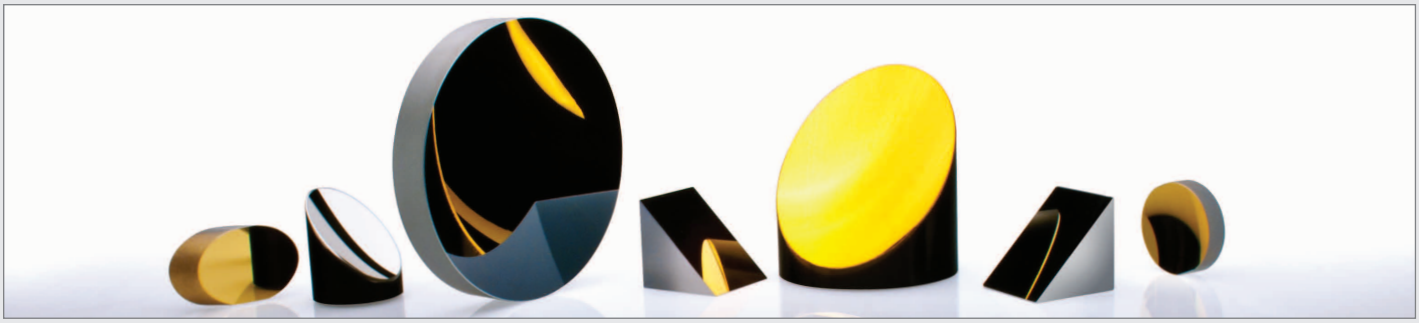
MIRRORS

- Easy Integration into a Variety of Applications from Laser Beam Steering to Machine Vision Inspection
- Coatings Optimized from UV to Long Wave IR
- Wide Range of Substrates and Sizes to Meet Every Application Need



MIRRORS SELECTION GUIDE

	Laser Mirrors	Size Range	Surface Accuracy	Substrates	Coating Options
	Laser Specific Mirrors	12.5 - 50mm	1/10λ	Fused Silica	Nd:YAG, Excimer, Argon-Ion, Diode
	Broadband Laser Mirrors	12.5 - 50.8mm	1/10λ	Fused Silica	UV, VIS, IR, Ti:Sapphire
	Superpolished Substrates	12.5 - 25mm	1/10λ	Fused Silica, Zerodur	Uncoated
	Precision Flat Mirrors	**Size Range**	**Surface Accuracy**	**Substrates**	**Coating Options**
	Optical Flat Mirrors	12.7 - 304.8mm	1/4λ, 1/10λ, 1/20λ	Fused Silica, Zerodur	Aluminum, Gold, Silver
	Standard Flat Mirrors	**Size Range**	**Surface Accuracy**	**Substrates**	**Coating Options**
	Polished First Surface Mirrors	5 - 100mm	1/4λ, 1/8λ, 1/10λ	Pyrex, Fused Silica	Aluminum, Gold, Silver, Dielectric
	Float Glass First Surface Mirrors	5 - 408mm	4-6λ	Float Glass	Aluminum, Gold
	Metal Substrate Mirrors	**Size Range**	**Surface Accuracy**	**Substrates**	**Coating Options**
	Off-Axis Parabolic Metal Mirrors	25.4 - 101.6mm	1/4λ RMS	Aluminum	Aluminum, Gold
	Metal Mirrors	25.4 - 76.2mm	1/4λ RMS	Aluminum	Aluminum, Gold
	Focusing Mirrors	**Size Range**	**Surface Accuracy**	**Substrates**	**Coating Options**
	Off-Axis Parabolic Mirrors	25.4 - 101.6mm	1/4λ, 1/2λ, 1/4λ RMS	Soda Lime, Aluminum	Aluminum, Gold
	Precision Parabolic Mirrors	76.2 - 412.8mm	1/8λ	Pyrex	Aluminum, Gold
	Precision Spherical Mirrors	25.4 - 317.5mm	1/4λ, 1/8λ	Pyrex	Aluminum, Gold
	Specialty Mirrors	**Size Range**	**Surface Accuracy**	**Substrates**	**Coating Options**
	Deformable Mirrors	28.0 - 50.8mm	N/A	Nitrocellulose	Silver
	Rod and Cone Mirrors	1 - 15mm	1/2λ	N-BK7	Aluminum
	Right Angle Prism Mirrors	3 - 75mm	1/8λ	N-BK7	Aluminum, Gold
	Convex Spherical Mirrors	12 - 50mm	1/4λ	N-BK7	Aluminum, Gold

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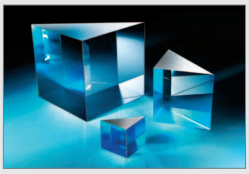
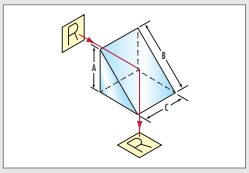
PRISMS

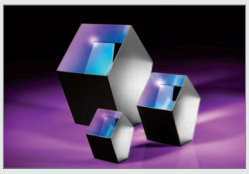


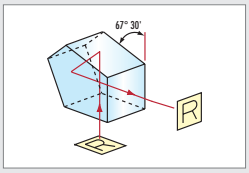


RIGHT ANGLE PRISMS

Applications:
- Deviate line of sight by 90°
- Endoscopy, microscopy, laser alignment and medical instrumentation

EO Advantage:
- 0.18 - 75mm sizes
- N-BK7, N-SFL11, UV fused silica and crystalline substrates
- Standard to high tolerance offerings (±5arcmin to ±15arcsec angle tolerance)
- Uncoated, multiple Anti-Reflection and metallic coating options

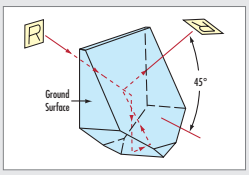




PENTA PRISMS

Applications:
- Deviate line of sight by 90° without inverting or reverting image
- Visual targeting, projection, measurement and display systems

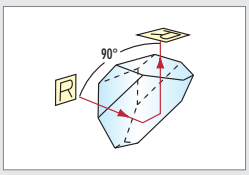
EO Advantage:
- 0.5 - 50mm sizes
- N-BK7 and UV fused silica substrates
- Standard and high tolerance offerings (±3arcmin to ±1arcmin angle tolerance)
- Uncoated, MgF_2, VIS 0° and UV-AR coating options



SCHMIDT AND HALF PENTA PRISMS

Applications:
- Deviate line of sight by 45° while inverting and reverting image
- Stereo microscopes and Pechan erector assemblies

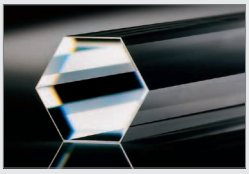
EO Advantage:
- 10 - 25mm sizes
- N-BK7 substrate
- Uncoated entrance/exit faces and protected aluminum and inconel roof coating options

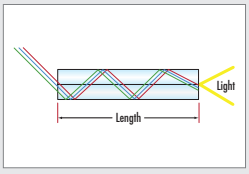


AMICI ROOF PRISMS

Applications:
- Deviate line of sight by 90° without reverting and inverting image
- Microscopes and telescope eyepieces

EO Advantage:
- 9mm and 14mm sizes
- N-BK7 substrate
- 6arcsec resolution

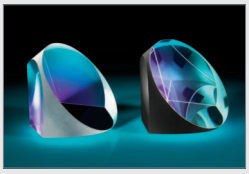


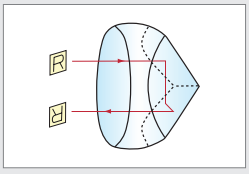


LIGHT PIPE HOMOGENIZING RODS

Applications:
- Homogenize non-uniform light sources
- LED illuminators, micro projectors and laser speckle reducers

EO Advantage:
- 2 - 20mm entrance/exit aperture sizes, 25 - 300mm lengths
- N-BK7 and fused silica substrates
- Low, standard and high NA versions
- Hexagonal entrance/exit apertures

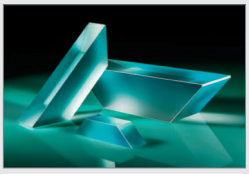


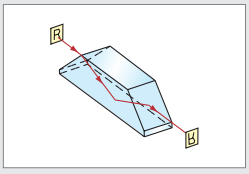


TRIHEDRAL PRISMS (RETROREFLECTORS)

Applications:
- Useful for alignment due to 180° beam reflection
- Interferometry, boresighting, rangefinding and laser tracking

EO Advantage:
- 6.35 - 127.0mm sizes
- N-BK7, UV fused silica, Pyrex substrates
- ±1arcsec to ±30arcsec beam deviations
- Uncoated, aluminum, silver and gold coating options
- Unmounted, mounted and hollow versions

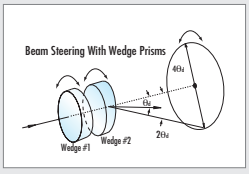




DOVE AND RHOMBOID PRISMS

Applications:
- Displace or rotate images
- Interferometry, astronomy binoculars and laser instrumentation

EO Advantage:
- 0.5 - 50mm sizes
- N-BK7 substrate
- Uncoated, VIS 0° AR coating and protected aluminum metallic coating options

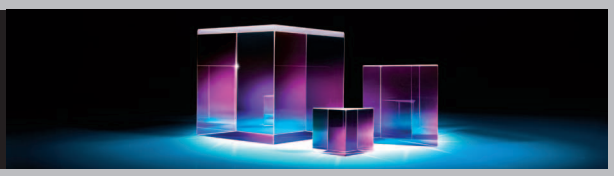


WEDGE PRISMS

Applications:
- Ideal for beam steering
- Tunable lasers, anamorphic imaging and forestry

EO Advantage:
- 0.5° - 15.0° nominal beam deviation
- N-BK7 and UV Fused Silica Substrates
- Uncoated, VIS 0° and VIS-NIR AR coating options

BEAMSPLITTERS

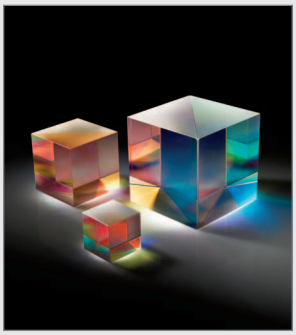


BEAMSPLITTERS

Beamsplitters are commonly intended to be used at a normal or 45° incident angle and are meant to split the input light into two separate parts. The light may be split by percentage of overall intensity, wavelength, or polarization state. A beamsplitter will have a specified ratio of percentage of light transmitted and percentage of light reflected such as 50%R/50%T or 30%R/70%T. Beamsplitters are available in a wide variety of coating types, substrates, and configurations.

STANDARD BEAMSPLITTERS

With Standard Beamsplitters, incident light is split by a specified percentage ratio independent of wavelength or polarization state. Applications include illumination subassemblies, biomedical instrumentation, and environmental monitoring.



STANDARD BEAMSPLITTERS

	Size Range	Wavelength Range	R/T Ratio
Visible and NIR Plate Beamsplitters	12.5 - 75 x 75mm	400 - 700nm, 700 - 1100nm	20/80, 30/70, 40/60, 50/50, 60/40, 70/30, 80/20
Plate Beamsplitters	12.5 - 254 x 356mm	400 - 700nm	25/75, 30/70, 40/60, 50/50, 70/30, 75/25
UV Plate Beamsplitters	10 - 50 x 50mm	250 - 450nm	30/70, 50/50, 70/30
Elliptical Plate Beamsplitters	12.5 - 50mm	400 - 700nm, 700 - 1100nm	50/50
Infrared Plate Beamsplitters	25.4 - 50.8mm	2 - 8µm, 7 - 14µm	50/50
Polka-Dot Beamsplitters	12.7 - 50.8mm	250 - 2000nm	50/50
Pellicle Beamsplitters	25.4 - 152.4mm	400 - 700nm	8/92, 40/40, 33/67, 50/50
Standard Cube Beamsplitters	5 - 50mm	400 - 700nm	30/70, 50/50, 70/30
Lateral Displacement Beamsplitters	10 - 20mm	430 - 670nm, 720 - 1080nm	50/50
Penta Prism Beamsplitters	12.7 - 25.4mm	450 - 680nm	50/50

DICHROIC BEAMSPLITTERS

Dichroic Beamsplitters split incident light by wavelength. Options range from laser beam combiners designed for specific laser wavelengths to broadband Hot and Cold Mirrors for splitting visible and infrared light. Commonly used in fluorescence applications.

DICHROIC BEAMSPLITTERS

	Size Range	Cut-On Wavelength Range
Fluorescence Dichroic Filters	12.5 - 25.2 x 35.6mm	409 - 801nm
Dichroic Laser Beam Combiners	12.5 - 50mm	427 - 659nm

NON-POLARIZING BEAMSPLITTERS

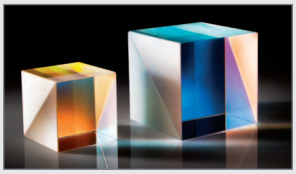
Non-Polarizing Beamsplitters will split the incident light by a specific percentage and is controlled to not alter the S and P polarization states. Useful for a variety of applications including optical interferometry, biomedical instrumentation and laser beam manipulation.

NON-POLARIZING BEAMSPLITTERS

	Size Range	Wavelength Range	R/T Ratio
Broadband Non-Polarizing Cube Beamsplitters	5 - 50mm	430 - 670nm, 720 - 1080nm, 1100 - 1620nm	50/50
Laser Line Non-Polarizing Plate Beamsplitters	12.5 - 50mm	355nm, 488nm, 532nm, 633nm, 1064nm	50/50
Lateral Displacement Beamsplitter	10 - 20mm	430 - 670nm, 720 - 1080nm	50/50

POLARIZING BEAMSPLITTERS

Polarizing Beamsplitters will split unpolarized light into S and P polarization states. Applications include semiconductor and photonics instrumentation.



POLARIZING BEAMSPLITTERS

	Size Range	Wavelength	R/T Performance
Broadband Polarizing Cube Beamsplitters	5 - 50mm	420 - 680nm, 700 - 1100nm	Reflect S / Transmit P
Laser Line Polarizing Cube Beamsplitters	5 - 50mm	488nm, 532nm, 632.8nm, 780nm, 850nm, 980nm, 1064nm	Reflect S / Transmit P
Lateral Displacement Beamsplitters	10 - 20mm	632.8nm	Reflect S / Transmit P
Broadband Polarizing Plate Beamsplitters	12.5 - 25mm	420 - 670nm	Reflect S / Transmit P

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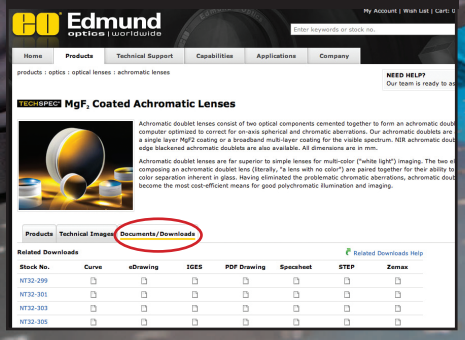
DIGITAL ENGINEERING FILES



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