

# Prisms & Polarizers

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### Optics

Lenses & Microscope Components

Coatings

Mirrors, Beamsplitters & Windows

Prisms & Polarizers

Filters

Pinholes

### Opto-mechanics

Tables, Breadboards & Rails

Mounting Hardware

Mirror & Component Mounts

Manual Micro-positioners

Motorized Positioners

### Lasers & Accessories

Beam Delivery

Laser Measurement

Diode Laser Modules

# Right Angle Prisms

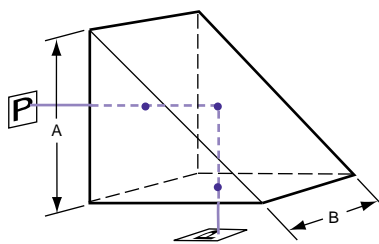


- *Laser or laboratory quality*
- *Fused silica or glass*
- *90 or 180 degree reflection*
- *Antireflection coatings available*

## 90° Deflection

For a 90° deflection the total internal reflection occurs at the hypotenuse face. Provided that the prism surface is clean and the incident angle on the hypotenuse is at 45°, the prism will act as a very efficient broadband reflector. The image is erect and reversed.

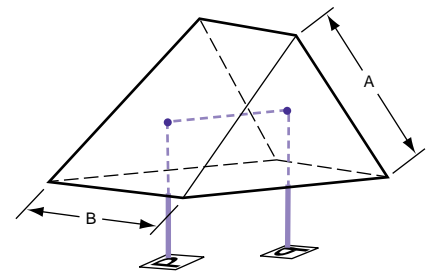
## 90° Deflection



## 180° Deflection

For a 180° deflection the Right Angle Prism is used with the hypotenuse as the entrance and exit face, with the total internal reflection occurring at the right angle faces. The main application of this is to use it as a retroreflector provided that the plane of the incident beam includes the vertex.

## 180° Deflection



A Right Angle Prism is used to turn or deflect a beam through 90° or 180°. In either case this is achieved by total internal reflection and produces a very efficient broadband reflector.

It is important that the incoming beam is collimated and enters the prism at a normal angle of incidence. This is so that total internal reflection can be achieved.

A range of both laser and laboratory quality prisms are available. These are available in either fused silica or BK7 glass.

## Kinematic Prism Platforms



Kinematic Prism Platforms are also available.

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### Laser Quality

Ealing offers a range of laser quality right angle prisms. These have been manufactured with high precision and selected for low scatter. Surface finish and angular accuracy are tightly maintained.

Fused silica is an ideal material for most laser applications because of its thermal handling capabilities. Glass is recommended for lower power applications.

**Specifications**  
**FUSED SILICA LASER QUALITY RIGHT ANGLE PRISMS**  
**Material:** UV grade fused silica  
**Wavelength Range:** 200-2500 nm  
**Dimensions Tolerance:** +0 - 0.25 mm  
**Angular Deviations Tolerance:** ±3 mins  
**Surface Quality:** 10-5  
**Flatness:** λ/10  
**Uncoated**

**GLASS LASER QUALITY RIGHT ANGLE PRISMS**  
**Material:** BK7 glass  
**Wavelength Range:** 330-2100 nm  
**Dimensions Tolerance:** +0 - 0.25 mm  
**Angular Deviations Tolerance:** ±3 mins  
**Surface Quality:** 20-10  
**Flatness:** λ/4  
**Uncoated**

### Fused Silica Laser Quality Right Angle Prisms

Catalog Number	Size A=B (mm)	Price US
24-8831	12.7	\$126.00
24-8864	25.4	\$210.00
24-8880	38.1	\$350.00
24-8898	50.8	\$473.00

### Glass Laser Quality Right Angle Prisms

Catalog Number	Size A=B (mm)	Price US
24-8039	5.0	\$49.00
24-8054	10.0	\$49.00
24-8062	12.7	\$49.00
24-8070	15.0	\$62.00
24-8088	20.0	\$62.00
24-8096	25.4	\$62.00

### Laboratory Quality

A range of laboratory quality right angle prisms is offered for general purpose laboratory use.

For UV applications, fused silica is highly recommended. For visible or NIR applications, BK7 is the best material choice.

**Specifications**  
**FUSED SILICA RIGHT ANGLE PRISMS**  
**Material:** UV grade fused silica  
**Wavelength Range:** 200-2500 nm  
**Dimensions Tolerance:** ±0.5 mm  
**Angles Tolerance:** ±10 arcmin  
**Surface Quality:** 60-40  
**Flatness:** 1λ  
**Uncoated**

**GLASS RIGHT ANGLE PRISMS**  
**Material:** BK 7 glass  
**Wavelength Range:** 330-2100 nm  
**Dimensions Tolerance:** ±0.25 mm  
**Angles Tolerance:** ±5 arcmin  
**Surface Quality:** 80-50  
**Flatness:** 2λ  
**Uncoated**

### Fused Silica Laboratory Quality Right Angle Prisms

Catalog Number	Size A=B (mm)	Price US
24-4731	5.0	\$74.00
24-4749	10.0	\$95.00
24-4756	20.0	\$116.00
24-4764	25.0	\$147.00

### Glass Laboratory Quality Right Angle Prisms

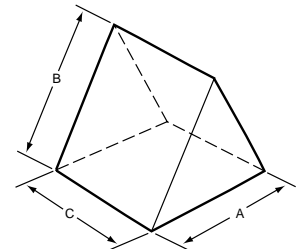
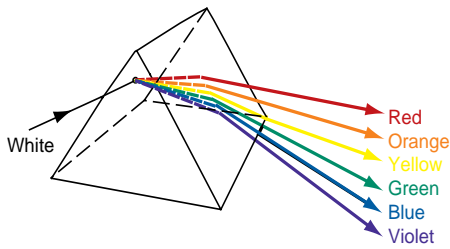
Size A=B (mm)	Catalog Number	Price US
2.0	24-2461	\$42.00
5.0	24-3659	\$35.00
10.0	24-3667	\$36.00
15.0	24-3675	\$37.00
20.0	24-3683	\$46.00
25.0	24-3378	\$49.00
30.0	24-3709	\$63.00
35.0	24-3717	\$99.00
40.0	24-3725	\$138.00
50.0	24-3394	\$172.00

- Optics
  - Lenses & Microscope Components
  - Coatings
  - Mirrors, Beamsplitters & Windows
  - Prisms & Polarizers
  - Filters
  - Pinholes
- Opto-mechanics
  - Tables, Breadboards & Rails
  - Mounting Hardware
  - Mirror & Component Mounts
  - Manual Micro-positioners
  - Motorized Positioners
- Lasers & Accessories
  - Beam Delivery
  - Laser Measurement
  - Diode Laser Modules

# Equilateral Prisms



- Ideal for wavelength separation in broadband applications
- BK7, SF10, or fused silica



## Specifications

### Material and Wavelength Range:

- BK7:** 330-2100 nm
- SF10:** 400-2400 nm
- Fused Silica:** 200-2500 nm

### Refractive Index:

- BK7:**  $n_d=1.517$   
 $n_F - n_C=0.0081$
- SF10:**  $n_d=1.728$   
 $n_F - n_C=0.0256$
- Fused Silica:**  $n_d=1.458$   
 $n_F - n_C=0.0068$

### Angular Dispersion:

- BK7:**  $0^{\circ}42'37''$
- SF10:**  $2^{\circ}58'25''$
- Fused Silica:**  $0^{\circ}34'01''$

**Dimensions Tolerance:**  $\pm 0.5$  mm

**Angles Tolerance:**  $\pm 5$  arcmin

**Surface Quality:** 80-50

**Flatness:**  $2\lambda$  per 25 mm

**Uncoated**

Equilateral Prisms are used routinely as dispersing elements where spectral separation is required. They provide better brightness (lower stray light) than diffraction gratings. They also have greater power handling capabilities and avoid possible confusion when trying to interpret overlapping spectral orders. It must be remembered that dispersion is

non-linear with wavelength and that surface reflection losses may affect throughput. Ealing offers Equilateral Prisms in three materials designed to suit a wide variety of dispersion, wavelength and surface reflection requirements. In general, a higher refractive index material produces greater angular separation.

## Equilateral Prisms

Dimensions A=B (mm) C (mm)	BK7 Glass		SF10 Glass		Fused Silica	
	Catalog Number	Price US	Catalog Number	Price US	Catalog Number	Price US
20 20	-		-		24-2131	\$110.00
25 25	24-3006	\$50.00	-		24-2149	\$150.00
30 30	24-3600	\$80.00	24-2966	\$106.00	24-2156	\$260.00
40 40	24-3501	\$90.00	24-2974	\$130.00	24-2164	\$290.00

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Motorized Positioners

## Lasers & Accessories

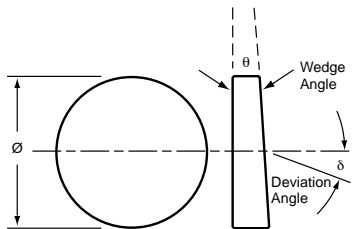
Beam Delivery

Laser Measurement

Diode Laser Modules

# Wedge Prisms

- Useful beam steering prisms
- AR coatings available



## Specifications

**Material:** BK7 glass  
**Wavelength Range:** 330-2100 nm  
**Diameter Tolerance:** +0 -0.10 mm  
**Angles Tolerance:** ±30 arcsec  
**Surface Quality:** 60-40  
**Flatness:**  $\lambda/4$   
**Uncoated**

Wedge Prisms are mainly used with laser beams, either for elimination of reflections from the second surface or for beam steering. The angle of deviation  $\delta$  of a collimated laser beam through a Wedge Prism with a wedge angle  $\theta$  and refractive index  $n$  is given by  $\delta = (n-1) \theta$ .

Wedge Prisms are often measured by their 'power' ( $\delta$ ) in diopters, where 1 diopter is a deflection of 1cm at a distance of 1m from the prism. Using two prisms of the same power in series and in close

## Wedge Prisms

Catalog Number	Dia Ø (mm)	Deviation <sup>1</sup> Angle δ (°)	Wedge Angle θ (°)	US Price
24-9169	25.0	2°	3°52'	\$47.00
24-9219	25.0	4°	7°40'	\$47.00

<sup>1</sup> Deviation for He-Ne laser 632.8 nm

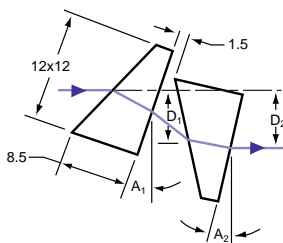


contact provides a very useful beam steerer. This is achieved by rotating the two prisms independently. A ray normal to the prisms can then be steered in any direction within a narrow cone around the undeviated path. Ealing offers two Wedge Prisms of different powers.

They are supplied uncoated, but may be antireflection coated by adding the appropriate coating suffix.

# Anamorphic Prism Pair

- Correction of beam asymmetry
- Optimized for 650-850 nm



## Specifications

**Material:** SF11 glass  
**Wavelength Range:** 650-850 nm  
**Size:** 12 x 12 x 8.5 mm  
**Dimension Tolerance:** ±0.1mm  
**Angle Tolerance:** ±15 arcmin  
**Surface Quality:** 60-40  
**Flatness:**  $\lambda/8$   
**Coating:** R <0.5% per surface, 650-850 nm

Anamorphic Prism Pairs are used mainly to correct the asymmetric beam shape of a Laser Diode – from elliptical to near circular shape. This is done by expanding (or contracting) the beam in one direction only while the other direction remains unchanged.

The aspect ratio of the elliptical beam varies according to the laser diode. Magnification is controlled by the angular position of the prisms relative to the incident beam (which has already

Magnification (X)	Prism angles		Displacement	
	A1 (Deg)	A2 (Deg)	D1 (mm)	D2 (mm)
2.0	21.2	6.0	5.1	5.3
3.0	30.4	0.1	6.4	6.4
4.0	35.2	-2.5	7.1	7.0
5.0	38.2	-3.9	7.6	7.4
6.0	40.4	-4.8	7.9	7.7



been collimated). The table shown lists the linear and angular dimensions of the prisms for various magnifications.

Ealing offers unmounted prisms in pairs. They are antireflection coated for use in the 650-850 nm region.

## Anamorphic Prism Pair

Catalog Number	Price US
24-9078	\$125.00

## Optics

Lenses & Microscope Components

Coatings

Mirrors, Beamsplitters & Windows

Prisms & Polarizers

Filters

Pinholes

## Opto-mechanics

Tables, Breadboards & Rails

Mounting Hardware

Mirror & Component Mounts

Manual Micro-positioners

Motorized Positioners

## Lasers & Accessories

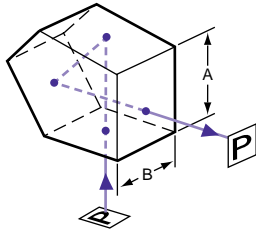
Beam Delivery

Laser Measurement

Diode Laser Modules

# Penta Prisms

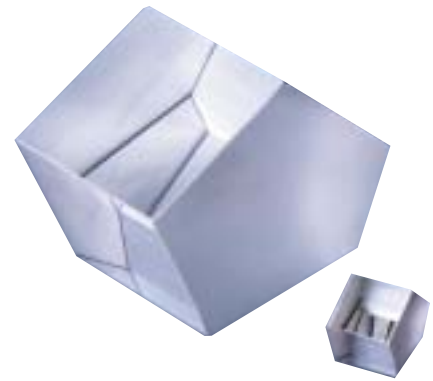
- Precise 90 degree deviation
- Designed for 400-700 nm



## Specifications

**Material:** BK7 glass  
**Wavelength Range:** 330-2100 nm  
**Beam Deviation:**  $90^\circ \pm 5'$   
**Dimension Tolerance:**  $+0 -0.1$  mm  
**Surface Quality:** 60-40  
**Surface Flatness:**  $\lambda/2$   
**Reflective Coating:** Al overcoated – Inconel & black paint on reflecting surfaces only  
**AR Coating:** R <0.5% per surface, 400-700 nm

Penta Prisms deviate an incident beam through  $90^\circ$  without inverting or reversing it. They also show constant deviation (i.e. the beam is deviated through  $90^\circ$  irrespective of the orientation of the prism). The accuracy of the  $90^\circ$  deviation is therefore only dependent on the manufacturing tolerances of the prism. These prisms are extremely useful when precise



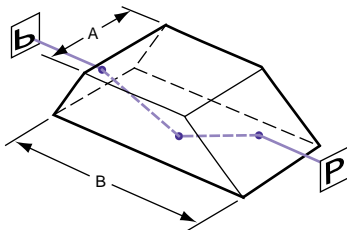
orientation of the prism is not possible and also where the path length through an instrument needs to be shortened. Typical applications include range finding, surveying, alignment and cinephotography. The reflecting faces are coated and the entrance and exit faces have an antireflection coating optimized for 400-700 nm.

## Penta Prisms

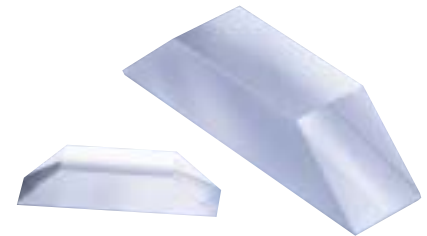
Catalog Number	Side		Price US
	A (mm)	B (mm)	
24-1364	5.0	5.0	\$77.00
24-1372	10.0	10.0	\$68.00
24-3840	20.0	20.0	\$89.00
24-3857	30.0	30.0	\$115.00

# Dove Prisms

- Image inversion and rotation
- Optimized for 400-700 nm



Dove Prisms are a truncated form of right angle prism. They use total internal reflection to produce an inverted image which emerges without any beam deviation. The main application for these prisms are as image rotators. Rotating the prism about an optical axis results in the image rotating at double



the angular velocity of the prism. It is very important that the incident beam is collimated for optimal performance. In addition the large reflecting face must be kept very clean.

## Dove Prisms

Catalog Number	Side		Price US
	A (mm)	B (mm)	
24-1414	10.0	42.3	\$74.00
24-1430	15.0	64.0	\$75.00
24-1448	20.0	79.5	\$110.00

## Specifications

**Material:** BK7 glass  
**Wavelength Range:** 330 - 2100 nm  
**Dimension Tolerance:**  $\pm 0.2$  mm  
**Angle Tolerance:**  $\pm 5$  arcmin  
**Surface Quality:** 80-50  
**Flatness:**  $1\lambda$   
**Coating:** R <0.5% per surface, 400-700 nm

Ealing Dove Prisms are broadband antireflection coated for 400-700 nm on the entrance and exit faces for maximum transmission.

Optics

Lenses & Microscope Components

Coatings

Mirrors, Beamsplitters & Windows

Prisms & Polarizers

Filters

Pinholes

Opto-mechanics

Tables, Breadboards & Rails

Mounting Hardware

Mirror & Component Mounts

Manual Micro-positioners

Motorized Positioners

Lasers & Accessories

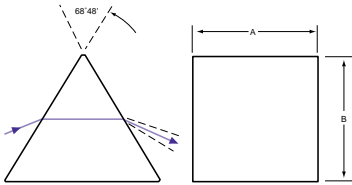
Beam Delivery

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Diode Laser Modules

# Brewster Prisms

- Ideal for laser tuning
- Laser quality



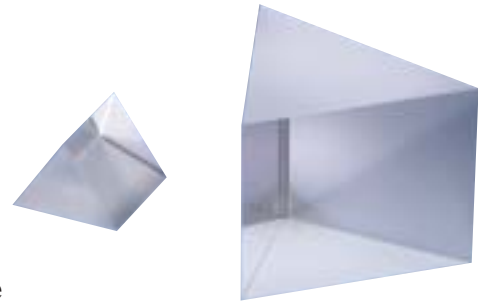
## Specifications

**Material:** UV grade fused silica  
**Refractive Index:**  $n_d = 1.458$   
**Angular Dispersion:**  $12^\circ$   
**Wavelength Range:** 190-2500 nm  
 for low reflection: 190-425 nm  
**Dimensions:**  $\pm 0.5$  mm  
**Apex Angle:**  $\pm 5$  arcmin  
**Surface Finish:** 10-5  
**Flatness:**  $\lambda/10$   
**Uncoated**

Brewster Prisms are designed to have an apex angle such that a p-polarized ray incident at Brewster's angle will pass through the prism parallel to the base at minimum deviation, and exit also at Brewster's angle. In this case surface reflection losses are negligible. Brewster Prisms are often used in

## Brewster Prisms

Catalog Number	Dimensions		Price US
	A (mm)	B (mm)	
24-2115	15.0	15.0	\$126.00
24-2198	25.4	25.4	\$242.00



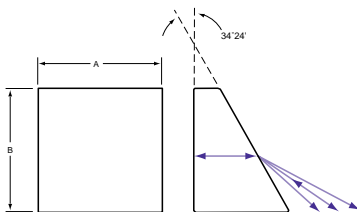
situations where surface reflection losses cannot be tolerated.

Brewster Prisms are also frequently used to select a single wavelength from a multi-wavelength laser. Tuning is accomplished by tilting the prism.

These prisms have very low surface reflection losses over the range 190-425 nm and are usable from 190-2500 nm.

# Littrow Prisms

- Ideal for laser tuning
- AR coatings



## Specifications

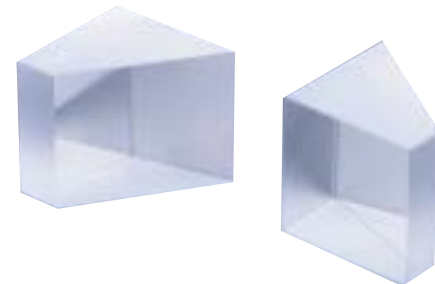
**Material:** UV grade fused silica  
**Refractive Index:**  $n_d = 1.458$   
**Angular Dispersion:**  $0^\circ 13' 40''$   
**Wavelength Range:** 350-2500 nm  
**Dimensions:**  $\pm 0.5$  mm  
**Apex Angle:**  $\pm 5$  arcmin  
**Surface Finish:** 10-5  
**Flatness:**  $\lambda/10$   
**Uncoated**

Littrow Prisms are of the same design as Brewster prisms but cut in half vertically from the apex to the base.

They are normally used in a laser cavity or prism spectrometer to select a particular wavelength. In general, the beam is incident on the hypotenuse and is reflected back from the rear surface. It

## Littrow Prisms

Catalog Number	Dimensions		Price US
	A (mm)	B (mm)	
24-2081	15	15	\$95.00
24-2099	25	25	\$200.00



exits from the hypotenuse dispersed into its constituent wavelength components. Tuning is accomplished by tilting.

Ealing Littrow Prisms are supplied uncoated but should be coated with an antireflection coating designed for  $45^\circ$  for optimal performance.

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