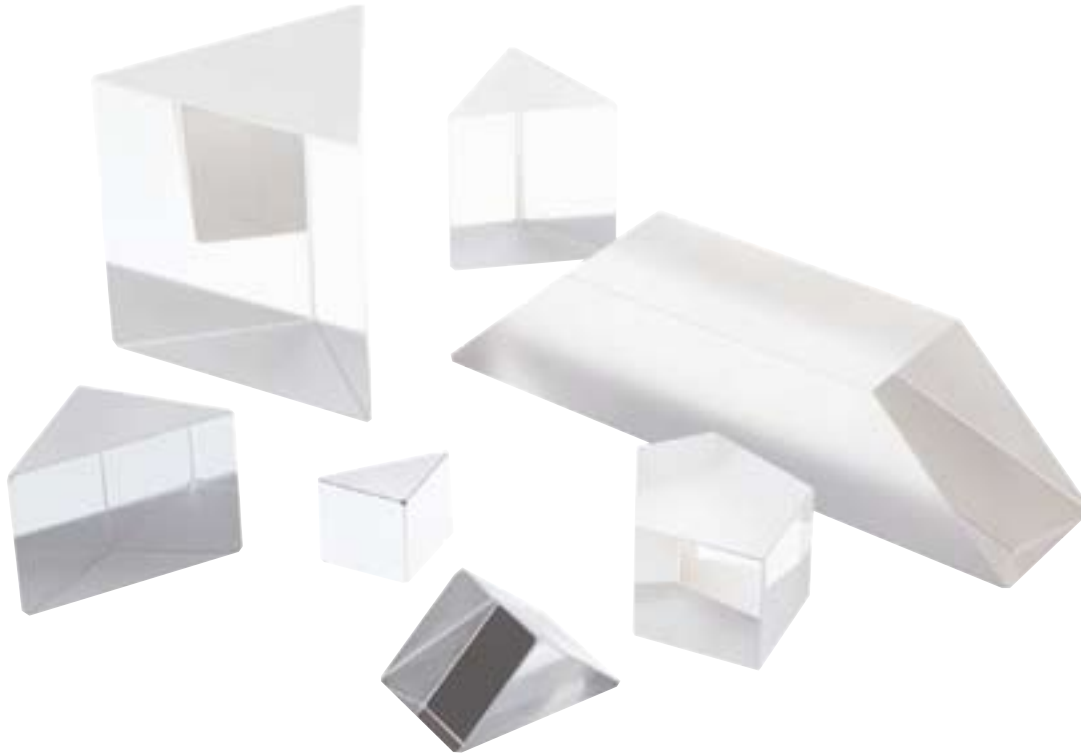


Prisms

- **Right Angle and Knife Edge Prisms** for steering, bending and redirecting light
- **Dove Prisms** invert the output beam by 180 degrees
- **Penta Prisms** for precise right angle beam folding independent of input angle
- **Retro-reflectors** precisely return the input beam to its source
- **Equilateral Prisms** disperse the input beam into its component colors
- **Precision Wedge Prisms** make useful beam steerers



Prisms have two main uses - redirecting an optical beam and dispersing the beam into its component colors. By careful control of the prism angles it is possible to perform some interesting and useful manipulations on the imaging light entering the prism.

In this section we include the following deviating prisms: right angle prisms, dove prisms, penta prisms, retro-reflectors and precision wedge prisms. We also offer a range of equilateral dispersing prisms.

Prisms are made from solid pieces of optical material. All faces are flat with the non-optical surfaces being left in their as-ground condition. The optically active faces are all ground and polished to the specified degree of flatness. Prisms are more difficult to manufacture than mirrors or windows because several surfaces must be held in a precise geometrical relationship to each other. Some prisms (retro-reflectors, for example) rely greatly on the precision of these geometrical relationships.

Because prisms are made from solid materials the optical path within the prism is fairly long compared to other optical components. When prisms are used in optical systems where the beam is either convergent or divergent they will introduce optical aberrations - primarily spherical aberration. Therefore, when using prisms in imaging or focusing systems, it is important to have collimated or nearly-collimated beams in this portion of the system.

Let us know if you need different types of prism which are not listed in this catalog. We will consider requests for other types of prisms if we know your specifications.

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If you need one of our prisms as soon as possible - just ask for next-day delivery. We try very hard to keep standard prisms in stock for immediate shipment — so you won't find yourself caught short trying to finish a project. We also have a wide range of special prism sizes and shapes available.

Right Angle and Knife Edge Prisms

We offer these prisms uncoated or with five different coating options, namely:

- **Broadband Multilayer Anti-Reflection** coating on legs
- **Protected Aluminum** on hypotenuse and **Broadband Multilayer Anti-Reflection** on legs
- **Protected Aluminum** on hypotenuse
- **Protected Aluminum** on legs
- **Broadband Multilayer Anti-Reflection** coating on hypotenuse

These are some of the most versatile prisms available. They can be used as internal or external reflectors or as retro-reflectors according to the orientation of the prism with respect to the incoming light. An uncoated prism will act as a mirror for light incident on one of the short sides (legs) since incident light is totally internally reflected at the hypotenuse. (TIR occurs when the angle of incidence is greater than the critical angle which for the glass-air interface occurs at 41.2 degrees). Even though uncoated prisms work well their useful full field of view is limited to 10 or 12 degrees in the visible. It is recommended that appropriate coatings be added to optimize the range of prism uses.

The Broadband Multilayer Anti-Reflection coating will withstand high power laser use, while the Protected Aluminum coating is evaporated aluminum overcoated with a layer of MgF_2 to protect it from scratches and abrasions. See page 16 for the Broadband AR transmission curve and page 27 for the Protected Aluminum reflectivity curve.



Specifications & Tolerances

Dimensions: +0, -0.15mm

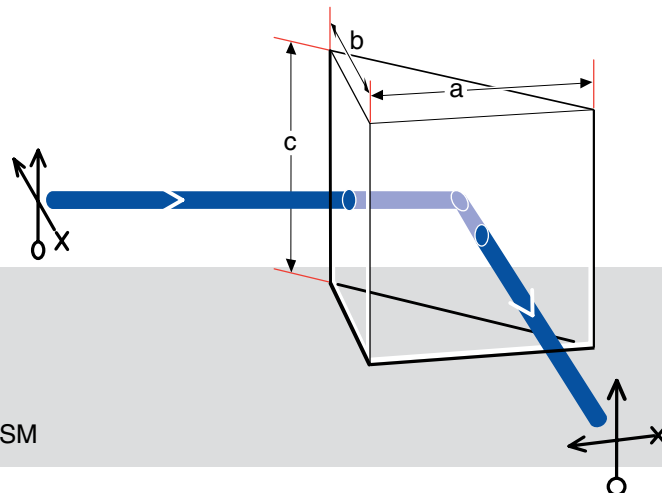
Angular deviation: ± 1 arcmin

Surface flatness: $\lambda/4$

Bevel: 0.2 to 0.3mm typical

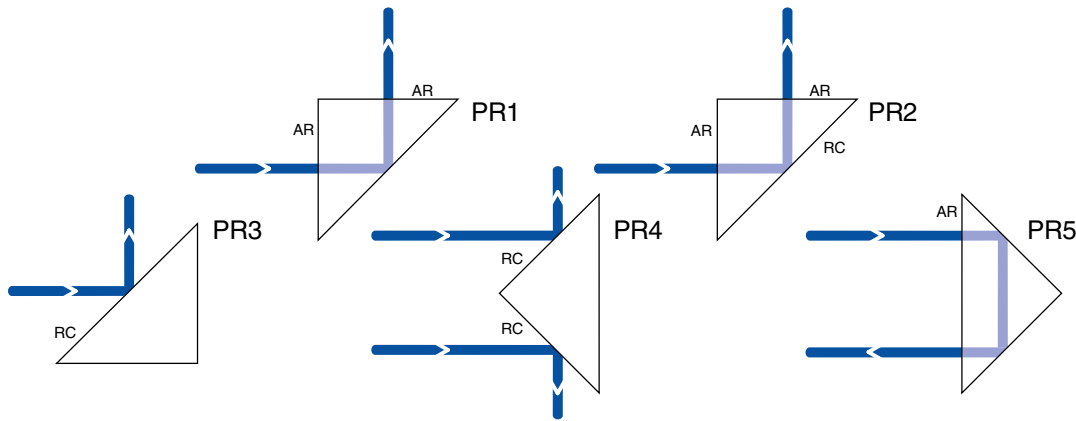
Surface quality: 40-20 (Coated)
20-10 (Uncoated)

Material: BK7, grade A or fused silica



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PRISM COATING OPTIONS

Right Angle Prisms

Material	Sides a=b=c (inch)	Sides a=b=c (mm)	Price	PART NUMBER
BK7	0.20	5.0	\$ 36.00	055-0110
	0.25	6.4	\$ 38.00	055-0115
	0.28	7.0	\$ 38.00	055-0117
	0.39	10.0	\$ 40.00	055-0120
	0.50	12.7	\$ 41.00	055-0125
	0.59	15.0	\$ 44.00	055-0130
	0.75	19.1	\$ 46.00	055-0135
	0.79	20.0	\$ 47.00	055-0140
	0.98	25.0	\$ 58.00	055-0150
	1.00	25.4	\$ 58.00	055-0155
	1.18	30.0	\$ 84.00	055-0160
	1.50	38.1	\$ 100.00	055-0162
	2.00	50.8	\$ 100.00	055-0165
Fused Silica	0.39	10.0	\$ 116.00	055-0190
	0.50	12.7	\$ 126.00	055-0193
	0.59	15.0	\$ 137.00	055-0195
	0.79	20.0	\$ 158.00	055-0197
	0.98	25.0	\$ 179.00	055-0200
	1.00	25.4	\$ 179.00	055-0203
	1.18	30.0	\$ 221.00	055-0205
Knife Edge BK7	0.39	10.0	\$ 56.00	055-0280
	0.59	15.0	\$ 63.00	055-0290
	0.79	20.0	\$ 74.00	055-0300

We try to keep all coating options in stock but please allow 2 weeks for coating if we do not have the option of your choice. Prisms are supplied uncoated unless coating suffix is appended. Suffix may be added to all right angle prisms above except knife edge. Call for coating price on knife edge prisms.

For **Broadband Multilayer AR** on legs **append -PR1** and add \$40.

For **Protected Aluminum** on hypotenuse and BMAR on legs **append -PR2** and add \$52.

For **Protected Aluminum** on hypotenuse **append -PR3** and add \$25.

For **Protected Aluminum** on legs **append -PR4** and add \$40.

For **Broadband Multilayer AR** on hypotenuse **append -PR5** and add \$20.

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Penta Prisms

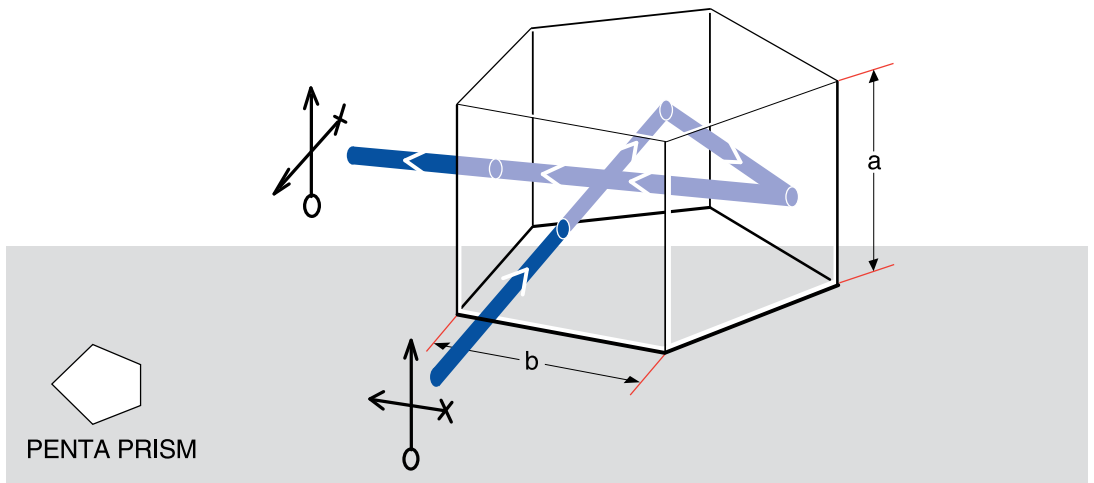
Penta prisms deviate an input beam by 270 degree (-90 degree) independently of the angle of incidence on the first surface. They are therefore useful as precise right angle mirrors which are insensitive to alignment. These penta prisms find many metrological applications.

These penta prisms are Anti-Reflection coated on the entrance and exit faces as well as being coated with protected aluminum and black paint on the internal reflection faces.



Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$	Angular deviation: 3arcmin
Surface flatness: $\lambda/4 @ 633\text{nm}$	Bevel: 0.2 to 0.3mm typical
Surface quality: 40-20	Material: BK7, grade A
Coatings: Broadband AR (425-675nm) on input/output faces protected aluminum and black paint on reflective faces	



Penta Prisms

Sides, a=b (mm)	Price	PART NUMBER
10.0	\$ 180.00	055-0550
15.0	\$ 220.00	055-0560
20.0	\$ 230.00	055-0570
25.0	\$ 265.00	055-0580

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Dove Prisms

Dove prisms have the useful property that they completely invert an image by 180 degrees. If the prism is rotated about its axis the image will rotate at twice the rate of rotation of the prism. Dove prisms provide the most convenient and most precise method of rotating a beam and their long length and square profile make them easy to mount in a cylindrical sleeve.



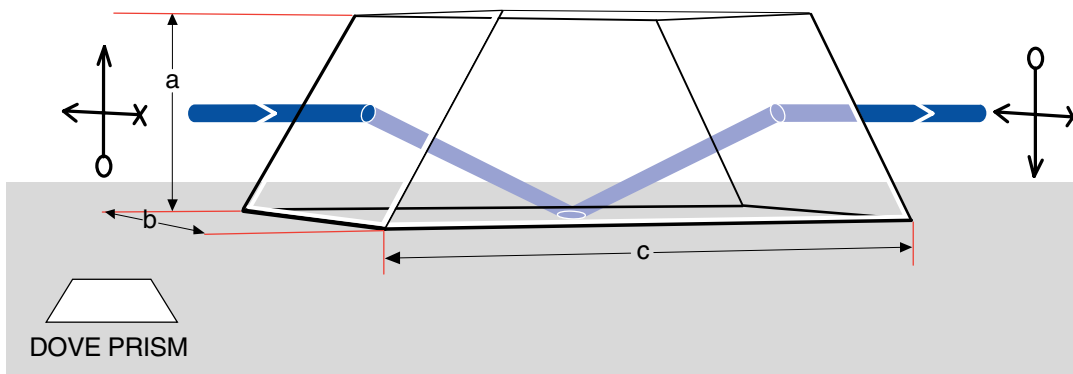
Because of the very limited field of view dove prisms need to be used with collimated or near-collimated beams.

These prisms are offered with a broadband multilayer anti-reflective coating on the end faces. The hypotenuse face acts as a TIR surface and is therefore normally not coated. It is important, therefore, to keep this surface clean.

Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$
 Surface flatness: $\lambda/4$ @ 633nm
 Surface quality: 40-20
 Coating: on end faces

Angular deviation: 3arcmin
 Bevel: 0.2 to 0.3mm typical
 Material: BK7, grade A



Dove Prisms

Sides, a=b (mm)	Length, c (mm)	Price	PART NUMBER
10.0	42.2	\$ 184.00	055-0360
15.0	63.3	\$ 200.00	055-0370
20.0	84.4	\$ 257.00	055-0380
25.0	105.5	\$ 341.00	055-0390
30.0	126.6	\$ 415.00	055-0440

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Hollow Retro-reflectors

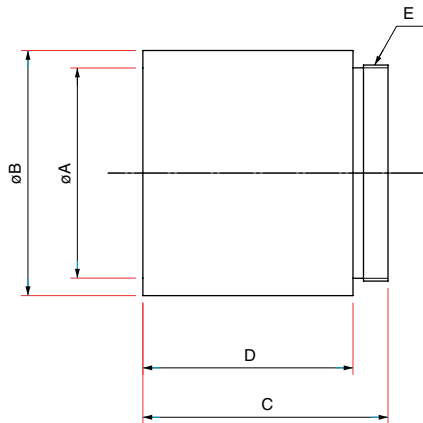
Hollow Retro-reflectors consists of three flat mirrors assembled to reflect the input beam by 180 degrees. Unlike the solid corner cubes, the entire optical path is in air and as a result can be used as a broadband reflector. Additionally, because the hollow retro-reflector is configured with only front surface mirrors, the design reduces the affects of polarization and chromatic aberration.



The precision assemble of the flat mirrors in the hollow retro-reflectors insure highly accurate beam deviation. Each retro-reflector is assembled in a black anodized aluminum mount. These “angle insensitive” mirrors have numerous uses in alignment and metrology. Our retro-reflectors come standard with protective aluminum for use in the visible spectral region.

Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$ Clear aperture: 80% of Inner Diameter
 Surface quality: 60-40 Material: BK7 grade A
 Coatings: Aluminum with protective overcoat



ØB (mm)	ØA (mm)	C (mm)	D (mm)	E (mm)	PART NUMBER
13	10	18	13	M10.85 P=0.75	055-2510
13	10	18	13	M10.85 P=0.75	055-2515
25	20	25	20	M20.85 P=0.75	055-2520
25	20	25	20	M20.85 P=0.75	055-2525
35	30	35	30	M30.85 P=0.75	055-2540
35	30	35	30	M30.85 P=0.75	055-2545

Hollow Retro-reflectors

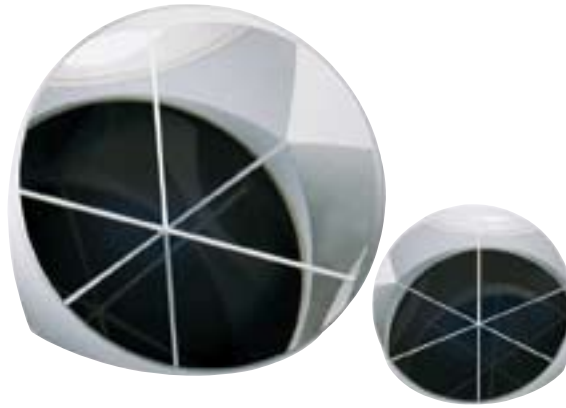
Housing Diameter, D (mm)	Housing Inner Diameter (mm)	Housing Length (mm)	Beam Deviation of Reflection (arcsec)	Wavefront Distortion	Price	PART NUMBER
13.0	10.0	18.0	≤ 10	1λ	\$ 945.00	055-2510
13.0	10.0	18.0	≤ 30	2λ	\$ 630.00	055-2515
25.0	20.0	25.0	≤ 5	1λ	\$ 735.00	055-2520
25.0	20.0	25.0	≤ 30	2λ	\$ 525.00	055-2525
35.0	30.0	35.0	≤ 5	1λ	\$ 630.00	055-2540
35.0	30.0	35.0	≤ 30	2λ	\$ 525.00	055-2545

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Retro-reflectors

Retro-reflectors, or corner cubes as they are sometimes called, have the property that light incident on the face of the prism is deviated by 180 degrees independently of its angle of incidence. This means that any light incident on the surface will be reflected back along the same path that it came from.



These retro-reflectors are extremely precise providing an exact 180 degree deviation within a 2arcsec tolerances. This enables them to be used for high precision applications or with lasers over very long distances. These “angle insensitive” mirrors have numerous uses in alignment and metrology. Our retro-reflectors come standard with a broadband AR coating on the face. Optional black paint protected silver may be specified for the legs.

Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$

Wavefront distortion: $\lambda/4$ @ 633nm

Surface quality: 40-20

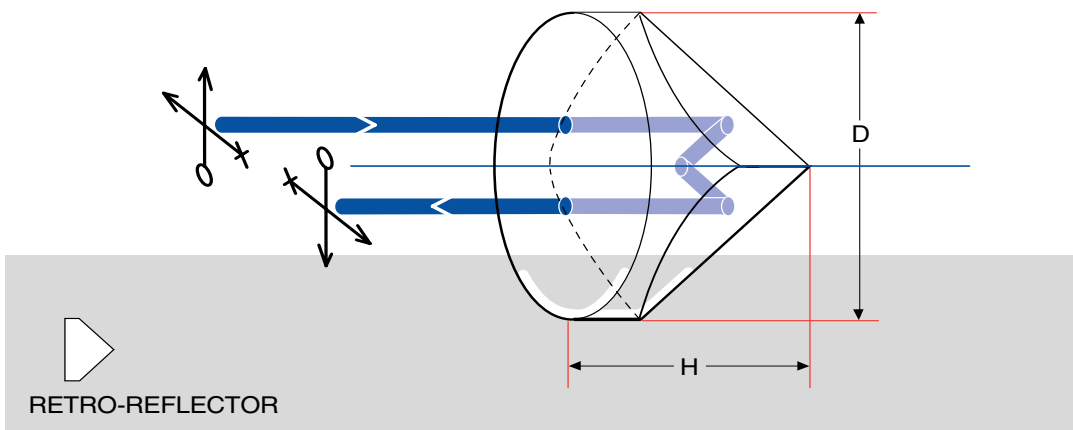
Coatings: Broadband AR (425-675nm) on face, optional silvered and black painted legs

Angular deviation: $\pm 2\text{arcsec}$

Bevel: 0.1 to 0.4mm typical

Material: BK7, grade A

Retro-reflectors provide a very effective method of locating objects in space. They are used in aircraft and automotive tooling jigs to locate assembly tools, in surveying to provide an easily found yet portable marker. One even landed on the moon to serve as a distance marker.



Retro-reflectors

Diameter, D (mm)	Height, H (mm)	Price	PART NUMBER
10.0	7.5	\$ 268.00	055-2280
12.7	9.5	\$ 273.00	055-2285
15.0	11.3	\$ 278.00	055-2290
20.0	15.0	\$ 284.00	055-2330
25.0	18.8	\$ 289.00	055-2340
30.0	22.5	\$ 294.00	055-2350
40.0	30.0	\$ 305.00	055-2360
50.0	37.5	\$ 315.00	055-2370

For **silvered** and **black painted** legs please **append -PR7** and add \$80.

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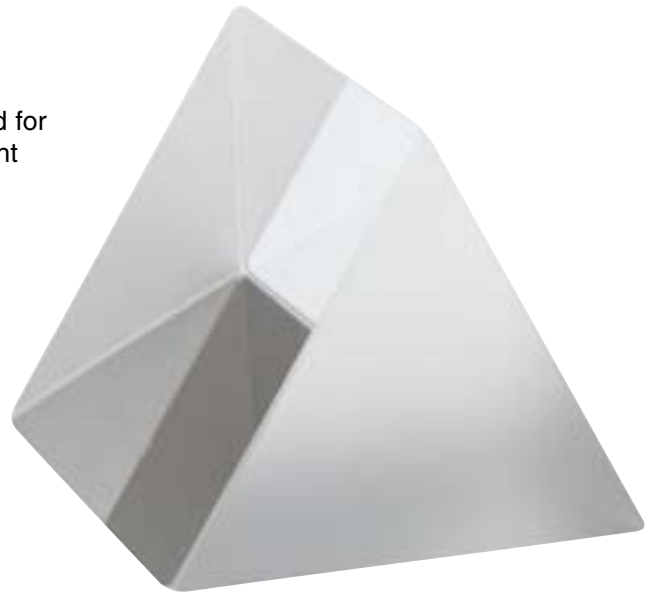
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Equilateral Prisms

Equilateral prisms are normally used for the dispersion of light into its different colors. Light incident at an oblique angle to the first face is dispersed according to its wavelength and emerges as a spectrum from the opposite face. We offer these prisms made from BK7 optical glass.

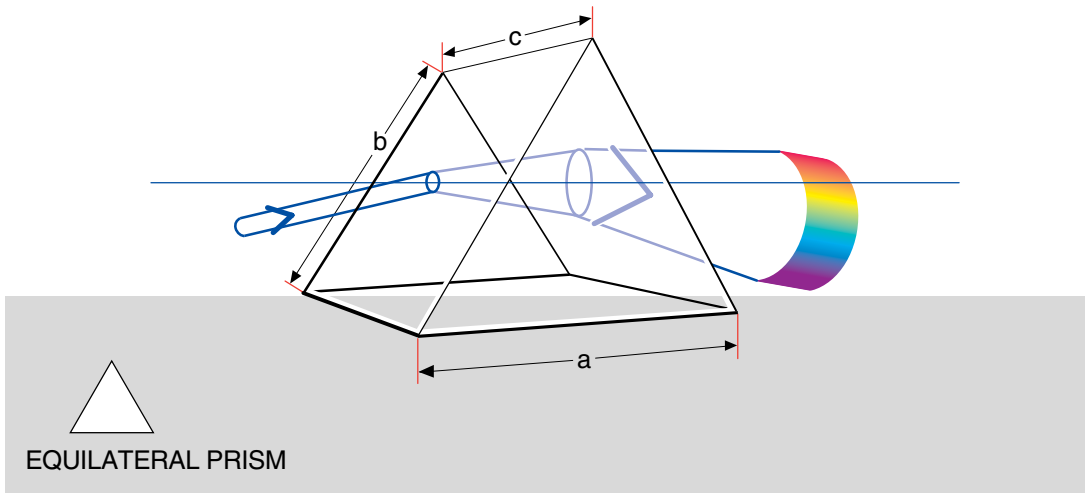


Let us know if you need different types of prisms which are not listed in this catalog. We have considerable experience in manufacturing a wide variety of prisms in other materials and to other levels of precision. We will consider requests for other types of prisms if we know your specifications.

Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$
 Surface flatness: $\lambda/10$ @ 633nm
 Surface quality: 20-10
 Coatings: on faces

Angular deviation: 3arcmin
 Bevel: $\pm 0.3\text{mm}$ typical
 Material: BK7
 Dispersion: $\Delta N = 0.01735$



Equilateral Prisms

Sides, $a=b=c$ (mm)	Material	Price	PART NUMBER
20	BK7	\$ 147.00	056-0120
25	BK7	\$ 168.00	056-0130
30	BK7	\$ 189.00	056-0140

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Precision Wedge Prisms

- Laser quality beam steering wedges
- Beam deviation from 1 to 10 degrees
- Can be used in pairs for continuous angular adjustment

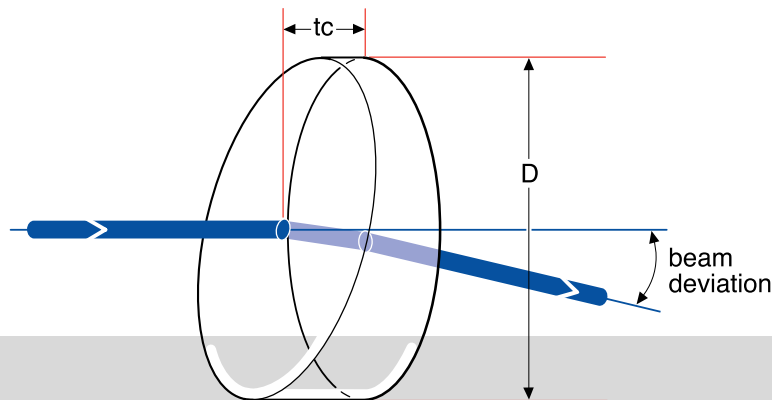
These wedge prisms are intended for steering laser beams. A beam normally incident on the perpendicular surface of the wedge will be deviated according to the angle in the table below. By selecting the appropriate wedge it is simple to create a precise beam deviation without affecting other beam parameters. If two wedges are used together with the sloping surfaces in close proximity it is possible to produce a continuous variation of beam deviation by counter-rotating the wedges. The angular adjustment obtainable in this way ranges from zero to 2 times the angle in the table. The prisms are manufactured from grade A optical glass. These wedge prisms are offered uncoated or with optional Anti-Reflection coatings as described on pages 18 and 19.



Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$
 Surface flatness: $\lambda/10@633\text{nm}$
 Surface quality: 20-10
 Coating: Optional (see pages 18 and 19)

Angular deviation: $\pm 1\text{arcmin}$
 Bevel: 0.2mm typical
 Material: BK7, grade A



WEDGE PRISM

Precision Wedge Prisms

Beam Deviation (deg)	Wedge Angle (deg)	Diameter, D (mm)	Center Thickness, tc (mm)	Price	PART NUMBER
1	1.93	25.0	3.4	\$ 92.00	055-0660
2	3.86	25.0	3.8	\$ 97.00	055-0665
4	7.67	25.0	4.7	\$ 100.00	055-0670
6	11.37	25.0	5.5	\$ 111.00	055-0675
8	14.95	25.0	6.3	\$ 128.00	055-0680
10	18.13	25.0	7.1	\$ 142.00	055-0685

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