

Polarizers

- **Glan Laser Prisms** for high performance, high power applications
- **Glan Taylor** and **Glan Thompson Prisms** provide high extinction ratios
- **Beamsplitting Thompson Prisms** split the s- and p- components
- **Beam Displacers** shift the s- and p- components
- **Wollaston Prisms** diverge the s- and p- components
- **Laser Polarizing Beamsplitters** separate the s- and p- components
- **Broadband Polarizing Beamsplitters** separate the s- and p- components
- **Dichroic Polarizers** are cost effective and convenient
- **Quartz Waveplates** provide controlled retardation
- **Quartz Depolarizers** scramble the in-coming beam polarization
- **Mica Waveplates** provide controlled retardation over a broadband region

We supply a wide range of polarization devices and we will be pleased to quote for your specific OEM and volume requirements. We are also able to provide most of these polarization devices with special mounting configurations and custom cells. Please call or write for further information.



Various materials may be used in optical polarization devices. Crystals, such as calcite, quartz and mica, exhibit different indices of refraction for different polarization orientations. These materials are referred to as being birefringent. Unpolarized light entering a birefringent crystal from the correct orientation is broken into two separate plane polarized beams. These are usually referred to as the ordinary (o-ray) and extraordinary (e-ray) rays. The plane polarized o-ray behaves according to Snell's law, whereas the orthogonally polarized e-ray does not and is refracted at an extraordinary angle. Other polarizers make use of organic materials which can be imbedded in plastic and then aligned to make them selectively absorb different polarization directions. And thin films can be stacked to act as multiple reflective polarizers. All of these techniques have their advantages in specific applications.

In light of this, we offer a wide range of components which affect the state of polarization. These include the following calcite elements: Glan laser prisms, Glan Thompson prisms, Glan Taylor prisms, Wollaston prisms and calcite beam displacers. All are made from a very high grade of optical quality natural calcite crystals which exhibits only very slight internal striae.

Other forms of polarization component included are: thin film laser polarizers, dichroic polarizers, quartz and mica waveplates and quartz depolarizers.

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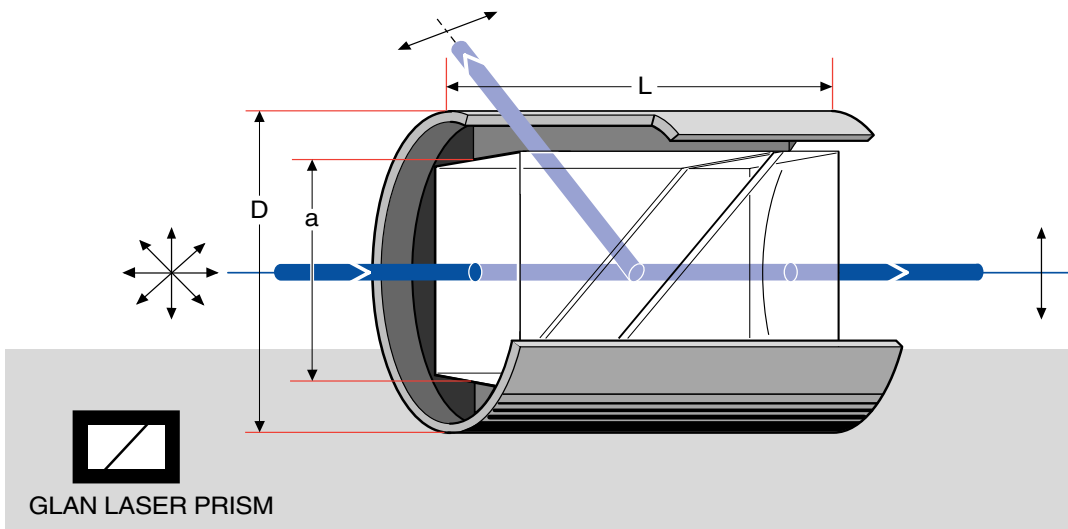
Filter & Apertures



Glan Laser Prisms

- High power capacity: up to 500MW/cm² pulsed
- Made from high optical quality natural calcite
- Conveniently mounted in a metal cell
- Available with two, one or no escape ports for extra power capacity
- Excellent extinction ratio of 5×10^{-5}

Glan laser prisms are a form of calcite prism which has been adapted for high power laser use. The two prism sections are polished at an angle between the critical angles of the e and o rays for the incoming light and are air-spaced and mounted within absorbing black glass in a cell. As light enters the polarizer one polarization orientation of the beam is refracted at a different angle from the other. Thus the e-ray hits the air-spaced interface at an angle below Brewster's angle and is transmitted. The o-ray is totally reflected out of the prism into either the black glass or the escape port. Normally they are supplied in a cylindrical cell but the cell can be cut away on one or both sides to provide an exit path for the unwanted beam. The escape port type has a greater power handling capacity than the plain metal mounts because the unwanted energy can be dumped outside the cell rather than being absorbed within it. The advantage of 2 ports is that light can enter the prism from either direction.



Specifications & Tolerances

Dimensions:

±0.2mm

Extinction ratio:

 5×10^{-5}

Angular field: ±1.5°

Length/Aperture

ratio: 1.5:1

Cell: Black finished aluminum

Material: Optical quality natural calcite

Surface quality:

40-20

Wavelength range:

400-2300nm

Maximum beam

deviation:

≤2.5arcmin

Maximum power level:	No Ports	1 Port	2 Ports
CW	100 W/cm ²	500W/cm ²	500W/cm ²
Pulsed	100MW/cm ²	500MW/cm ²	500MW/cm ²

Glan Laser Prisms

C E L L

Prism Side, a (mm)	Diameter, D (mm)	Length, L (mm)	Price	PART NUMBER
8	18.90	16.00	\$ 440.00	066-2220
10	22.00	21.00	\$ 520.00	066-2230
12	25.30	23.00	\$ 760.00	066-2240
15	28.50	26.00	\$ 1,025.00	066-2250
17	31.75	28.00	\$ 1,340.00	066-2260
20	34.80	32.00	\$ 1,760.00	066-2270

For a **single** escape port **append -1P** and add \$75 to the price.
For a **double** escape port **append -2P** and add \$150 to the price.

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Glan Taylor Prisms

- Available in both symmetrical and asymmetrical output configurations
- High extinction ratio of 5×10^{-5}
- Conveniently mounted in a metal cell
- Ideal for medium power applications requiring high performance
- Suitable for Ultra-Violet applications



These prisms are used in medium power applications requiring high transmission and a high degree of polarization purity. Like the Glan laser prisms they are air-spaced to minimize absorption losses. The two prism sections are mounted in absorbing black glass within the cell. Two types are offered — single and double. The single version is the simplest but the double version gives a perfectly symmetrical polarization field at the expense of a slight increase in Ultra-Violet absorption.

Specifications & Tolerances

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

Transmittance (e-ray): $>90\%$

Surface quality: 40-20

Extinction ratio: 5×10^{-5}

Single prism: Length/Aperture ratio: 0.85:1

Angular field: $\pm 4^\circ$

Polarization field: Asymmetrical

Maximum power level:

CW — $2\text{W}/\text{cm}^2$

Pulsed — $10\text{W}/\text{cm}^2$

Wavelength range: 215-2300nm

Material: Optical quality natural calcite

Cell: Black finished aluminum

Maximum beam deviation: 3arcmin

Double prism: Length/Aperture ratio: 1.8:1

Angular field: $\pm 6^\circ$

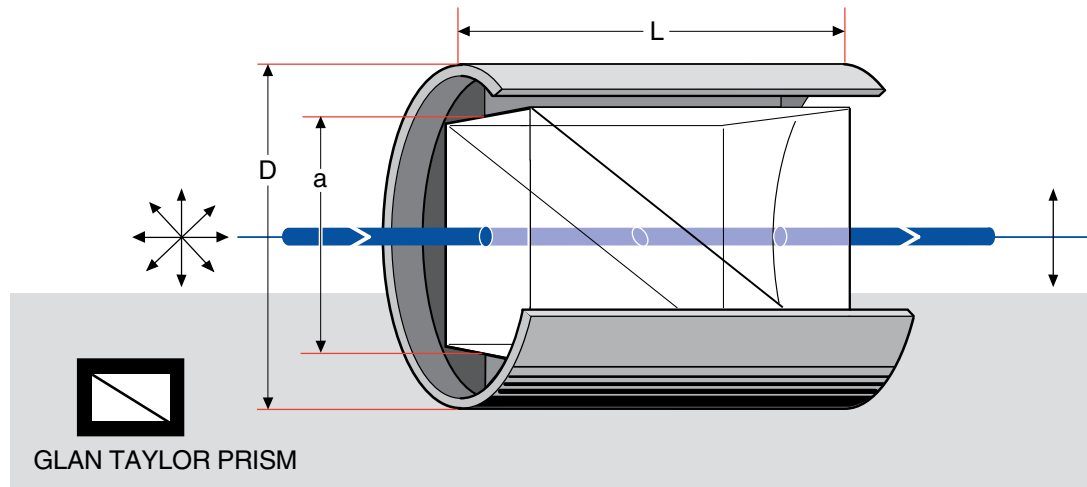
Polarization field:

Symmetrical

Maximum power level:

CW — $2\text{W}/\text{cm}^2$

Pulsed — $10\text{W}/\text{cm}^2$



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Glan Taylor Prisms

C E L L

Type	Prism Side, a (mm)	Diameter, D (mm)	Length, L (mm)	Price	PART NUMBER
Single	10.0	18.90	12.7	\$ 605.00	066-1120
Single	12.0	22.00	16.0	\$ 760.00	066-1130
Single	15.0	25.40	19.0	\$ 990.00	066-1140
Single	20.0	34.80	25.0	\$ 1,730.00	066-1160
Double	12.0	25.30	31.7	\$ 1,675.00	066-1220
Double	15.0	31.75	38.0	\$ 2,250.00	066-1230
Double	20.0	34.80	50.0	\$ 3,410.00	066-1240



Glan Thompson Prisms

- Available with either 15 degree or 25 degree full angular fields
- Cemented surfaces handle up to 5W/cm² pulsed
- E-ray transmittance better than 90%
- Provided in a convenient metal mounting cell

These polarizing prisms are the simplest form of calcite polarizer. They are cemented, making them only useful for relatively low power applications. They have a wide and symmetrical field of view and make extremely versatile general purpose polarizers. The o-ray is absorbed in the material surrounding the prism and the e-ray is transmitted. Two versions are offered having different length/aperture ratios and consequently different angular fields. These prisms are normally provided in a metal cell but since they are cemented together they can be supplied unmounted if required.

Specifications & Tolerances

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

Transmittance (e-ray): $>90\%$

Surface quality: 40-20

Extinction ratio: 1×10^{-5}

Short prism: Length/Aperture ratio: 2.5:1

Angular field: $\pm 7.5^\circ$

Polarization field: Symmetrical

Maximum power level:

CW — 1W/cm²

Pulsed — 5W/cm²

Wavelength range: 320-2300nm

Material: Optical quality natural calcite

Cell: Black finished aluminum

Maximum beam deviation: 2.5arcmin

Long prism: Length/Aperture ratio: 3:1

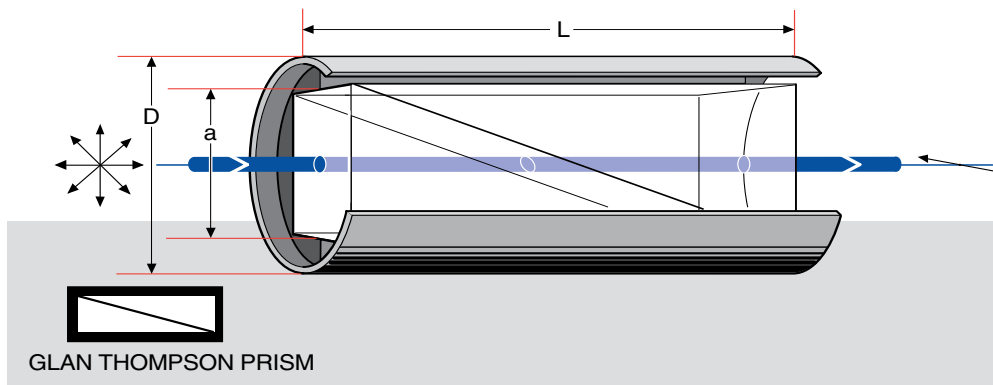
Angular field: $\pm 12.5^\circ$

Polarization field: Symmetrical

Maximum power level:

CW — 1W/cm²

Pulsed — 5W/cm²



Glan Thompson Prisms

C E L L

Length/ Aperture ratio	Side, a (mm)	Diameter, D (mm)	Length, L (mm)	Price	PART NUMBER
2.5	6.0	15.75	19.0	\$ 340.00	066-0120
2.5	8.0	18.90	24.9	\$ 415.00	066-0130
2.5	10.0	22.00	30.0	\$ 520.00	066-0150
2.5	12.0	25.40	35.0	\$ 710.00	066-0160
2.5	14.0	25.40	41.0	\$ 1,200.00	066-0170
3.0	6.0	15.75	22.0	\$ 415.00	066-0230
3.0	8.0	18.90	28.0	\$ 500.00	066-0240
3.0	10.0	22.00	35.0	\$ 625.00	066-0260
3.0	12.0	25.40	41.0	\$ 860.00	066-0270
3.0	14.0	25.40	46.0	\$ 1,420.00	066-0280

For unmounted prisms append **-U** and deduct \$50 from the price.

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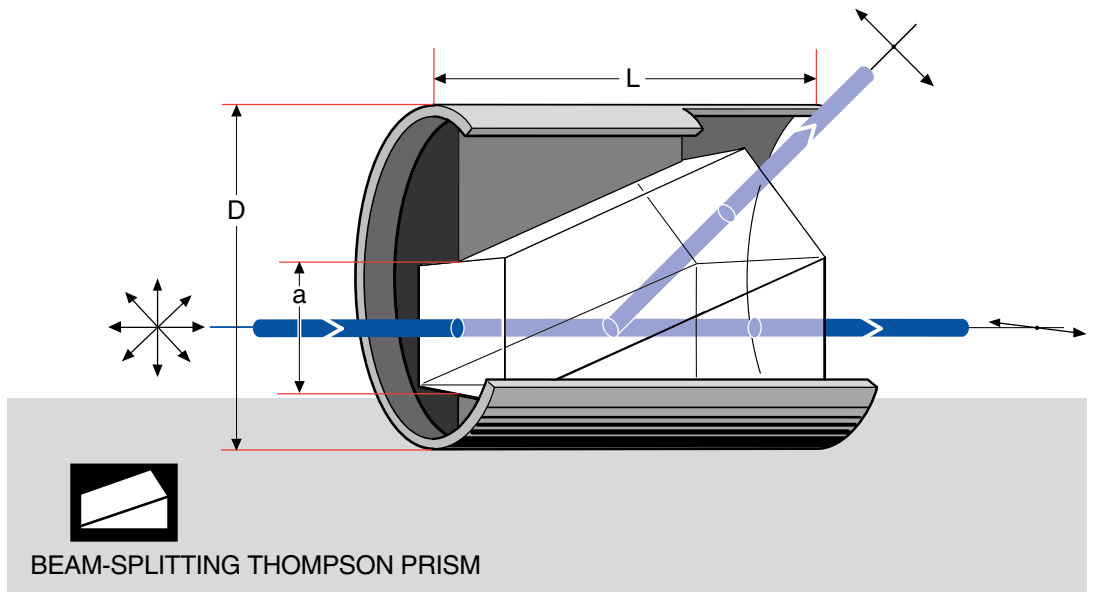
Beamsplitting Thompson Prisms

- Made from the highest quality natural calcite
- Provides a full 45 degree split between the two polarizations
- Mounted in a metal cell for convenience and protection
- Available in three sizes: 8mm, 10mm and 12mm square

These are Glan Thompson prisms which are extended to have an output face polished normal to the exiting o-ray. By this means it is possible to obtain a 45 degree split between the two orthogonal polarizations.

Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$
 Angular separation: 45°
 Surface quality: 40-20
 Extinction ratio: 1×10^{-5}
 Material: Optical quality natural calcite
 Wavelength range: 350-2200nm
 Asymmetry: 1°
 Cell: Black finished aluminum
 Maximum power level: CW — $1\text{W}/\text{cm}^2$
 Pulsed — $5\text{W}/\text{cm}^2$



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Beamsplitting Thompson Prisms

CELL				
Side, a (mm)	Diameter, D (mm)	Length, L (mm)	Price	PART NUMBER
8.0	25.00	30.0	\$ 1,310.00	066-3770
10.0	31.75	35.0	\$ 1,470.00	066-3780
12.0	38.00	41.0	\$ 2,150.00	066-3790



Beam Displacers

- Available with lateral beam displacements from 2 to 4mm
- Made from optical quality natural calcite
- Wide transmission range from 215nm to 2300nm
- Mounted in a metallic cell for protection and convenience

This simple calcite element separates the o-ray and the e-ray into two laterally displaced beams of orthogonal polarization.

These beam displacers are mounted in an aluminum cell for convenience in mounting.

Specifications & Tolerances

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

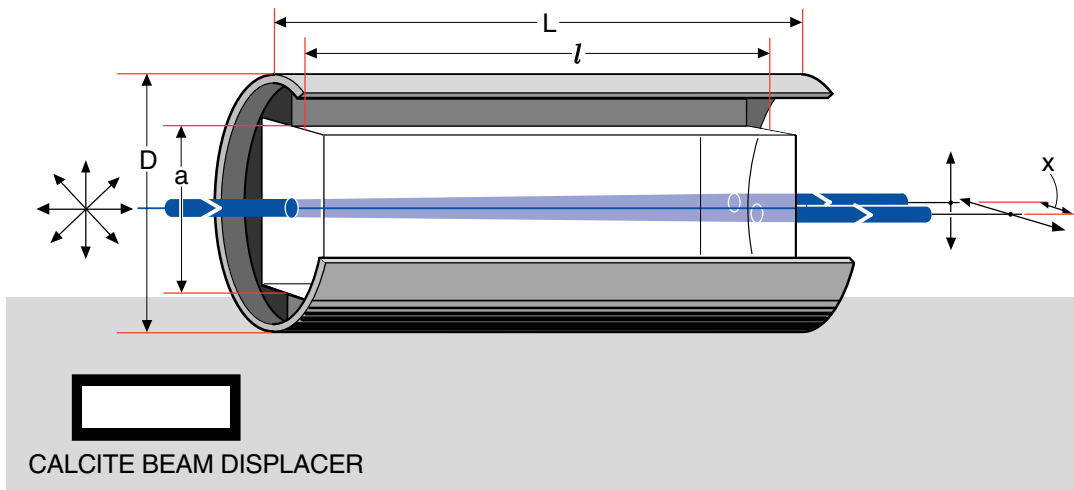
Surface quality: 40-20

Material: Optical quality natural calcite

Wavelength range: 215-2300nm

Cell: Black finished aluminum

Maximum power level: CW — $1\text{W}/\text{cm}^2$
Pulsed — $5\text{W}/\text{cm}^2$



Beam Displacers

C E L L

Displacement, x (mm)	Side, a (mm)	Length, l (mm)	Diameter, D (mm)	Length, L (mm)	Price	PART NUMBER
2.0	5.0	19.0	15.75	22.0	\$ 395.00	066-5550
2.7	8.0	24.0	18.90	28.0	\$ 500.00	066-5560
3.3	10.0	30.0	22.00	35.0	\$ 605.00	066-5570
4.0	12.0	36.0	25.40	41.0	\$ 730.00	066-5660

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Wollaston Prisms

- Evenly splits both polarizations into two divergent beams
- Available with 5, 10, 15 and 20 degree beam separation
- Mounted in a metal cell for convenience and protection
- Extinction ratio of 1×10^{-5}
- Handles power levels to 1W/cm^2 CW, 5W/cm^2 pulsed

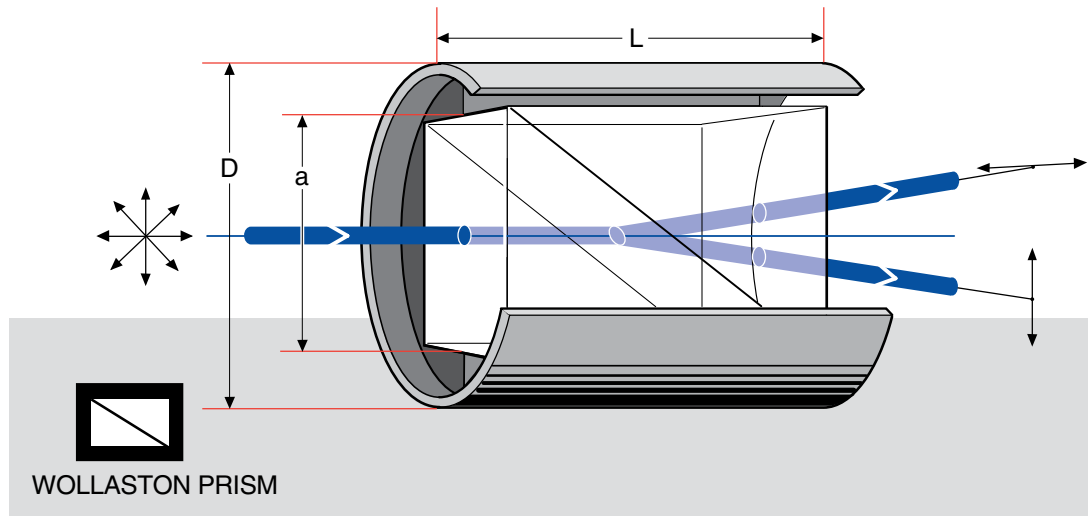


Wollaston Prisms split an incoming beam into two separate output beams of orthogonal polarization. The two beams have an angular separation which can be either 5, 10, 15 or 20 degrees and which is approximately symmetrical about the optical axis.

Specifications & Tolerances

Dimensions: $\pm 0.2 \text{mm}$
 Surface quality: 40-20
 Extinction ratio: 1×10^{-5}
 Material: Optical quality natural calcite

Wavelength range: 320-2200nm
 Cell: Black finished aluminum
 Maximum power level: CW — 1W/cm^2
 Pulsed — 5W/cm^2



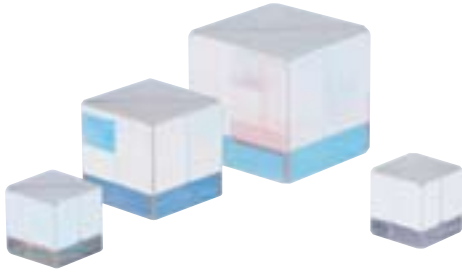
Wollaston Prisms

C E L L

Separation (deg)	Side, a (mm)	Asymmetry (arcmin)	Diameter, D (mm)	Length, L (mm)	Price	PART NUMBER
5	10.0	10	18.9	12.7	\$ 580.00	066-3330
5	12.0	10	22.0	16.0	\$ 625.00	066-3340
5	15.0	10	25.4	18.0	\$ 730.00	066-3350
5	20.0	10	34.8	22.0	\$1,390.00	066-3360
10	10.0	15	18.9	12.7	\$ 730.00	066-3370
10	12.0	15	22.0	18.0	\$ 815.00	066-3380
10	15.0	15	25.4	20.0	\$ 895.00	066-3390
10	20.0	15	34.8	22.0	\$ 1,520.00	066-3440
15	10.0	30	18.9	16.0	\$ 660.00	066-3450
15	12.0	30	22.0	19.0	\$ 790.00	066-3470
15	15.0	30	25.4	21.0	\$ 895.00	066-3480
15	20.0	30	34.8	25.4	\$ 1,420.00	066-3550
20	10.0	60	18.9	19.0	\$ 790.00	066-3560
20	12.0	60	22.0	23.0	\$ 895.00	066-3580
20	15.0	60	25.4	23.0	\$ 970.00	066-3590
20	20.0	60	34.8	32.0	\$ 1,730.00	066-3670

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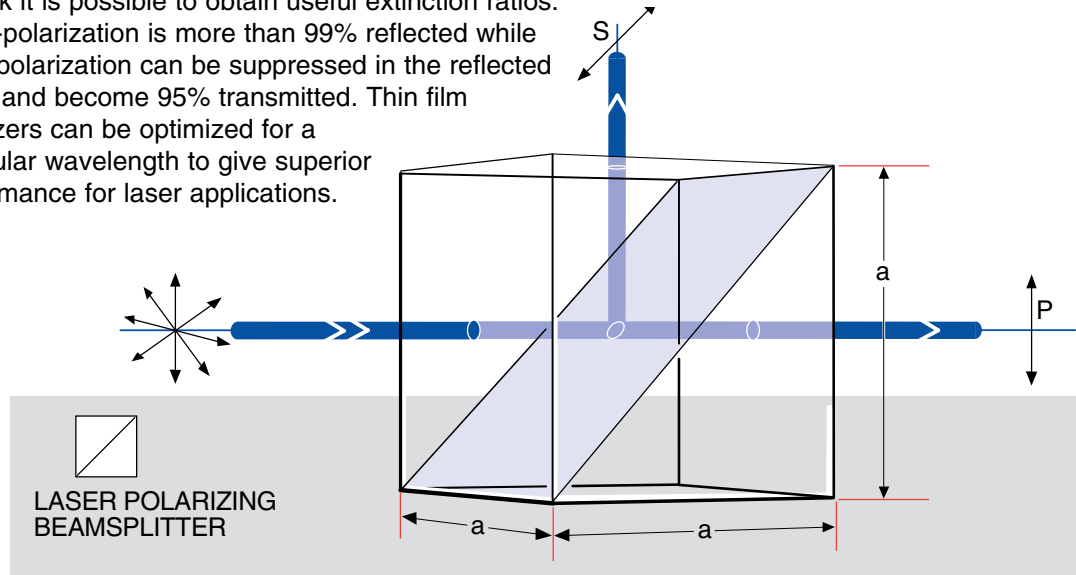


Laser Polarizing Cube Beamsplitters

- Thin film polarizers optimized for use at popular laser wave lengths
- Transmitted extinction ratio of better than 1×10^{-2}
- Reflected extinction ratio of better than 2×10^{-2}
- Polarizing film mounted on the internal face of a cube beamsplitter
- Multilayer high efficiency narrowband Anti-Reflection coatings on all faces

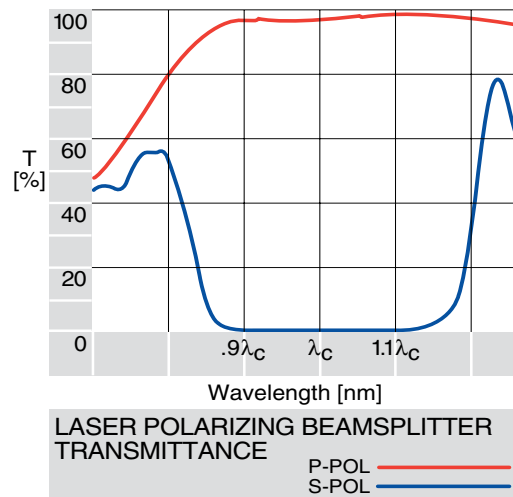
These are thin film polarizers constructed as a cube. Thin film polarizers utilize the polarization which occurs on reflection from a plane surface. By combining a large number of such surfaces in a stack it is possible to obtain useful extinction ratios.

The s-polarization is more than 99% reflected while the p-polarization can be suppressed in the reflected beam and become 95% transmitted. Thin film polarizers can be optimized for a particular wavelength to give superior performance for laser applications.



Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$
 Surface flatness: $\lambda/4$
 Beam deviation: $\leq 10\text{arcmin}$
 Asymmetry: 1°
 Surface quality: 40-20
 Material: BK7
 Coating: Narrowband Anti-Reflection coating on faces
 Extinction ratio: $T_s < 1 \times 10^{-2}$
 $R_p < 2 \times 10^{-2}$
 Damage threshold: $< 100\text{mJ/cm}^2$ in 10ns
 @1064nm



Please call if you need polarizing beamsplitters for other wavelengths, other sizes, or other configurations. We believe that you will be pleased by our competitive prices for volume requirements.

Laser Polarizing Cube Beamsplitters

Wavelength Range (nm)	Laser Type	Side, a (mm)	Price	PRODUCT NUMBER
441.6	HeCd	10.0	\$ 194.00	067-0120
441.6	HeCd	15.0	\$ 221.00	067-0130
441.6	HeCd	20.0	\$ 231.00	067-0140
457.9	HeCd	10.0	\$ 194.00	067-0170
457.9	HeCd	15.0	\$ 221.00	067-0180
457.9	HeCd	20.0	\$ 231.00	067-0190

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Wavelength Range (nm)	Laser Type	Side, a (mm)	Price	PRODUCT NUMBER
488	Ar Ion	10.0	\$ 194.00	067-0230
488	Ar Ion	15.0	\$ 221.00	067-0240
488	Ar Ion	20.0	\$ 231.00	067-0250
514.5	Ar Ion	10.0	\$ 194.00	067-0280
514.5	Ar Ion	15.0	\$ 221.00	067-0290
514.5	Ar Ion	20.0	\$ 231.00	067-0330
532	YAG 2nd	10.0	\$ 194.00	067-0360
532	YAG 2nd	12.7	\$ 205.00	067-0365
532	YAG 2nd	15.0	\$ 221.00	067-0370
532	YAG 2nd	20.0	\$ 231.00	067-0380
632.8	HeNe	5.0	\$ 184.00	067-0440
632.8	HeNe	10.0	\$ 194.00	067-0450
632.8	HeNe	12.7	\$ 205.00	067-0455
632.8	HeNe	15.0	\$ 221.00	067-0460
632.8	HeNe	20.0	\$ 231.00	067-0470
670	Diode	5.0	\$ 184.00	067-0490
670	Diode	10.0	\$ 194.00	067-0492
670	Diode	12.7	\$ 205.00	067-0493
670	Diode	15.0	\$ 221.00	067-0494
670	Diode	20.0	\$ 231.00	067-0496
780	Diode	5.0	\$ 184.00	067-0550
780	Diode	10.0	\$ 194.00	067-0560
780	Diode	12.7	\$ 205.00	067-0565
780	Diode	15.0	\$ 221.00	067-0570
780	Diode	20.0	\$ 231.00	067-0580
830	Diode	5.0	\$ 184.00	067-0670
830	Diode	10.0	\$ 194.00	067-0680
830	Diode	12.7	\$ 205.00	067-0685
830	Diode	15.0	\$ 221.00	067-0690
830	Diode	20.0	\$ 231.00	067-0770
1064	YAG	5.0	\$ 231.00	067-1020
1064	YAG	10.0	\$ 231.00	067-1030
1064	YAG	12.7	\$ 231.00	067-1040
1064	YAG	15.0	\$ 231.00	067-1050
1064	YAG	20.0	\$ 231.00	067-1060
1300	Diode	5.0	\$ 184.00	067-1130
1300	Diode	10.0	\$ 194.00	067-1140
1300	Diode	12.7	\$ 205.00	067-1145
1300	Diode	15.0	\$ 221.00	067-1150
1300	Diode	20.0	\$ 231.00	067-1160
1321-1343	Diode	5.0	\$ 184.00	067-1170
1321-1343	Diode	10.0	\$ 194.00	067-1172
1321-1343	Diode	12.7	\$ 205.00	067-1173
1321-1343	Diode	15.0	\$ 221.00	067-1174
1321-1343	Diode	20.0	\$ 231.00	067-1176
1550	Diode	5.0	\$ 184.00	067-1190
1550	Diode	10.0	\$ 194.00	067-1220
1550	Diode	12.7	\$ 205.00	067-1225
1550	Diode	15.0	\$ 221.00	067-1230
1550	Diode	20.0	\$ 231.00	067-1240

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Polarizing beamsplitters for other sizes and wavelengths can be produced to special order. Please call.

High Power Laser Polarizing Cube Beamsplitters

- Thin film polarizers optimized for use at popular laser wavelengths
- Transmitted extinction ratio of better than 2.5×10^{-3}
- Reflected extinction ratio of better than 2×10^{-2}
- Polarizing film mounted on the internal face of a cube beamsplitter
- Multilayer high efficiency narrowband Anti-Reflection coatings on all faces

These are thin film polarizers constructed as a cube. Thin film polarizers utilize the polarization which occurs on reflection from a plane surface. By combining a large number of such surfaces in a stack it is possible to obtain useful extinction ratios. The s-polarization is more than 99% reflected while the p-polarization can be suppressed in the reflected beam and become 95% transmitted. Thin film polarizers can be optimized for a particular wavelength to give superior performance for laser applications.

Specifications & Tolerances

Dimensions: ± 0.2 mm

Surface flatness: $\lambda/4$

Beam deviation: ≤ 10 arcmin

Asymmetry: 1°

Surface quality: 40-20

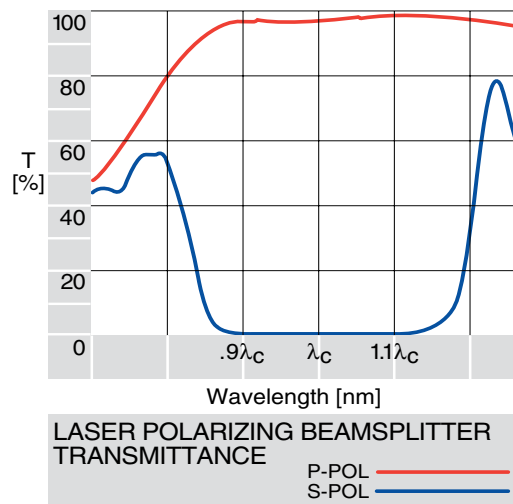
Material: BK7

Coating: Narrowband multilayer

Anti-Reflection on faces

Extinction ratio: $T_s < 2.5 \times 10^{-3}$, $< 5 \times 10^{-3}$
@1064 nm $R_p < 2 \times 10^{-2}$

Damage threshold: < 7 J/cm² in 10ns
@1064nm



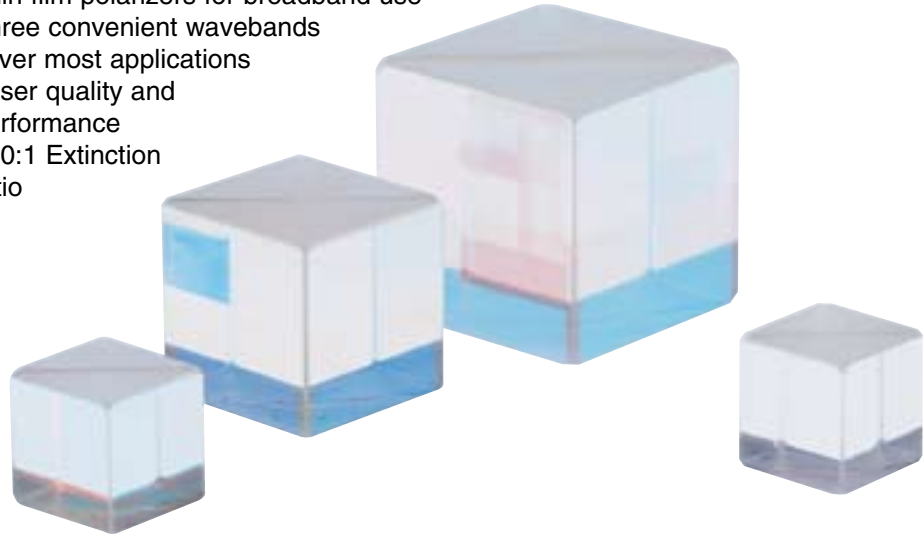
High Power Laser Polarizing Cube Beamsplitters

Wavelength Range (nm)	Cube Side, a (mm)	Material	Surface Flatness	Price	PART NUMBER
355	10.0	SFS	$\lambda/4$	\$ 500.00	067-3100
355	15.0	SFS	$\lambda/4$	\$ 550.00	067-3110
355	20.0	SFS	$\lambda/4$	\$ 725.00	067-3120
532	10.0	BK7	$\lambda/4$	\$ 450.00	067-3130
532	15.0	BK7	$\lambda/4$	\$ 500.00	067-3140
532	20.0	BK7	$\lambda/4$	\$ 650.00	067-3150
1064	10.0	BK7	$\lambda/4$	\$ 450.00	067-3160
1064	15.0	BK7	$\lambda/4$	\$ 500.00	067-3170
1064	20.0	BK7	$\lambda/4$	\$ 650.00	067-3180

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Broadband Polarizing Beamsplitters

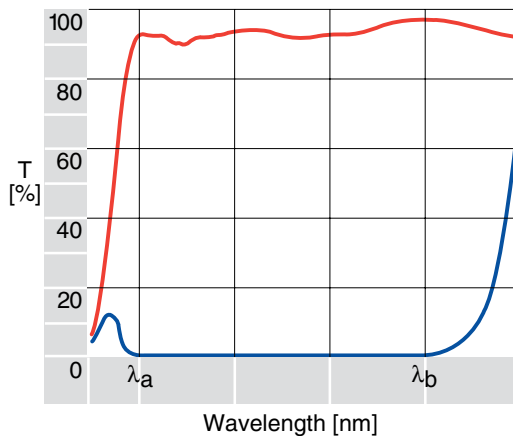
- Thin film polarizers for broadband use
- Three convenient wavebands cover most applications
- Laser quality and performance
- 100:1 Extinction ratio



These thin film cube beamsplitters combine the excellent characteristics of the laser polarizing beamsplitters previously described with the advantage of broadband application. The polarizing film is fully protected within the cube making them durable and convenient to use. Three wavebands have been chosen to cover most general applications: 450-680 covers the visible spectrum and a wide selection of laser wavelengths, 650-850 covers most visible range diode lasers and 1300-1600 covers most telecommunications band diode lasers. Although these polarizers will work well over the entire broadband specified they are manufactured to laser performance standards.

Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$
 Surface flatness: $\lambda/4$
 Beam deviation: $\leq 10\text{arcmin}$
 Surface quality: 40-20
 Material: BK7
 Coating: Broadband Anti-Reflection coating on faces
 Extinction ratio: 100:1



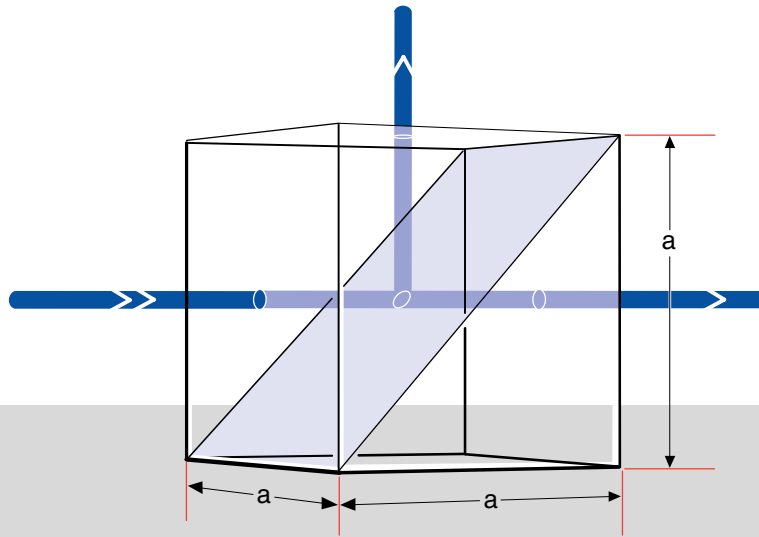
BROADBAND POLARIZING
 BEAMSPLITTER
 TRANSMITTANCE

P-POL	—
S-POL	—



If you need one of our beamsplitters as soon as possible - just ask for next-day delivery. We try very hard to keep all of our precision beamsplitters in stock for immediate shipment. So you won't find yourself caught trying to finish a project without the correct product.

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BROADBAND POLARIZING BEAMSPLITTER

Broadband Polarizing Beamsplitters

Wavelength Range (nm)	Side, a (mm)	Price	PART NUMBER
450-680	10.0	\$ 242.00	067-2220
450-680	15.0	\$ 250.00	067-2230
450-680	20.0	\$ 257.00	067-2240
650-850	10.0	\$ 242.00	067-2270
650-850	15.0	\$ 250.00	067-2280
650-850	20.0	\$ 257.00	067-2290
1300-1600	10.0	\$ 242.00	067-2350
1300-1600	15.0	\$ 250.00	067-2360
1300-1600	20.0	\$ 257.00	067-2370



Our beamsplitter cube assembly takes place in a clean room environment to ensure high quality.

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Micro Optics

Mirrors

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Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

Dichroic Polarizers

- Plastic sheet polarizers are convenient and useful for multiple purposes
- Available with glass cover plates and mounting ring for rigidity and protection
- Unmounted versions available up to 100mm in diameter
- Single sheet transmission of 36%
- Extinction ratio of 1×10^{-4} for high contrast applications



Dichroic polarizing filters would seem to be mis-named since dichroic literally means 'having two colors'. The name is a hold over from several decades ago when sheet polarizers were often used in combination with a full wave plate to produce a very eye-sensitive magenta (i.e., red combined with blue) analyzer for stress, hence the name.

These are sheets of dichroic plastic material which provide a reasonable degree of polarization at an economical price. They are laminated between two thin sheets of glass for rigidity and mounted in a metal ring for ease of use and handling. The optic axis is marked.

These are broadband devices operating over a range of 380-750nm, and 760-2000nm.

We also offer economical unmounted sheets of this material which are neither sandwiched between glass covers nor mounted in the aluminum ring around the outside. The unmounted material has a slight tendency to curl in one direction.

Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$
 Extinction ratio: 1×10^{-4}
 Transmittance @550nm: 36% (single sheet)
 26% (two open sheets)

Material: Dichroic plastic
 Temperature range: -30 to $+80^\circ\text{C}$
 Coating: Broadband Anti-Reflection

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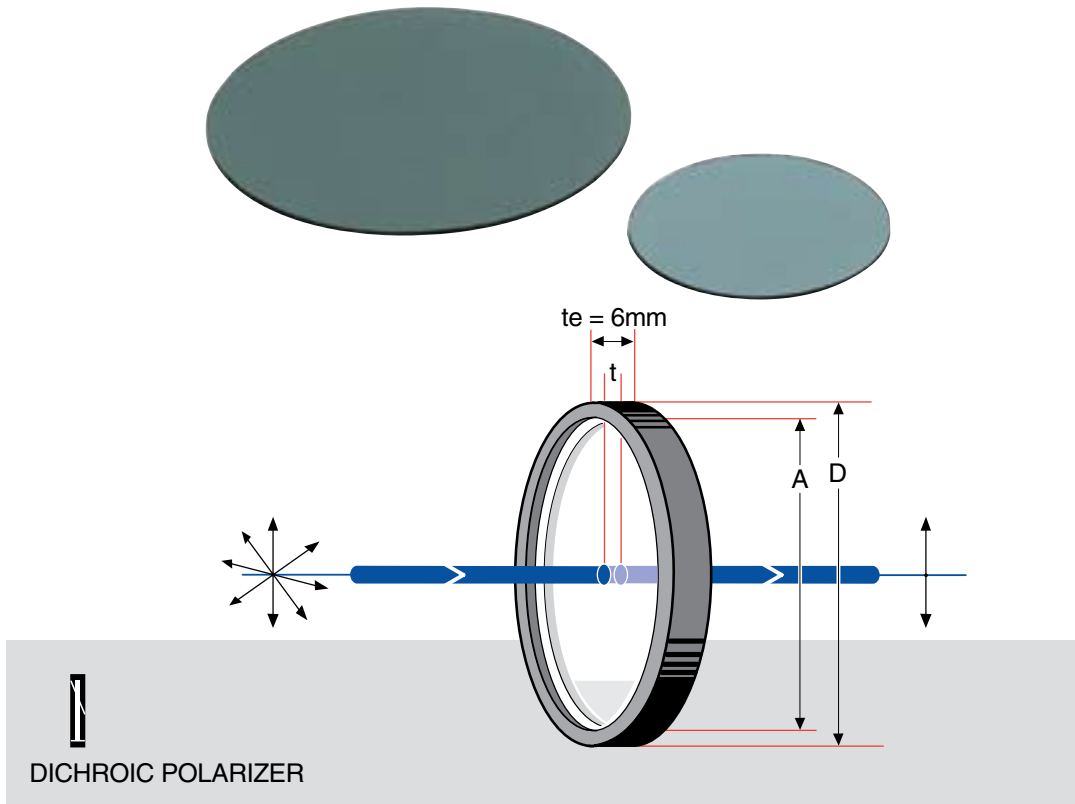
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- Filter & Apertures



Dichroic Polarizers

Diameter, D (mm)	Aperture, A (mm)	Thickness, t (mm)	Wavelength Range (nm)	Glass/Metal Mount	Price	PART NUMBER
25.4	24.0	0.75	400-700	No	\$ 30.00	069-1105
30.0	28.0	0.75	400-700	No	\$ 30.00	069-1110
50.0	47.0	0.75	400-700	No	\$ 35.00	069-1120
100.0	94.0	0.75	400-700	No	\$ 100.00	069-1130
30.0	24.0	3.00	400-700	Yes	\$ 100.00	069-0110
50.0	44.0	3.00	400-700	Yes	\$ 130.00	069-0120
30.0	24.0	3.00	760-2000	Yes	\$ 370.00	069-0140



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Most of our polarizers are available from stock and can be shipped to you the same day that your order is placed.



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- Beamsplitters
- Polarizers**
- Filter & Apertures

Quartz Waveplates

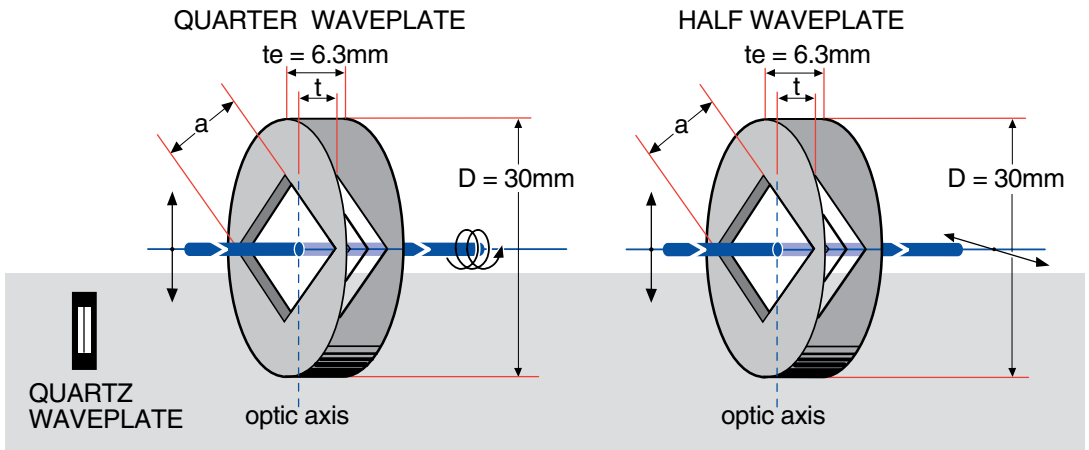
- First order **Quartz Waveplates**
- Made from high quality optical grade crystalline quartz
- 17mm by 17mm square clear aperture
- Mounted in a metal ring with engraved wavelength identification
- Optically contacted for precision retardation
- Both quarter wave and half wave retardation versions available



These are formed from two thin sections of crystalline quartz which have been cut to include the optic axis. The two sections are polished to different thicknesses in order to have exactly the required retardation difference. They are then optically contacted with the axes opposed. In this way it is possible to provide precise first order retardation in a plate of usable thickness. The plates are 17mm square with a combined thickness of 5mm. They are mounted in a 30mm diameter by 6mm thick cell with the combined optic axis along the diagonal. The cell is engraved with the wavelength and the retardation. We offer both $\lambda/4$ retardation and $\lambda/2$ retardation waveplates for a variety of wavelengths.

Specifications & Tolerances

Dimensions: +0, -0.2mm
 Parallelism: ≤ 5 arcsec
 Surface quality: 20-10
 Coating: Narrowband Anti-Reflection
 Wavefront: $\lambda/10$
 Retardation: $\lambda/500$
 Material: Crystal quartz
 Mounting: Black finished aluminum



Quartz Waveplates

Wavelength (nm)	Side, a (mm)	Thickness, t (mm)	Price	PART NUMBER	
				$\lambda/4$ retardation	$\lambda/2$ retardation
266.0	17.0	5.0	\$ 455.00	068-1110	068-1330
325.0	17.0	5.0	\$ 455.00	068-1130	068-1350
355.0	17.0	5.0	\$ 455.00	068-1140	068-1360
405.0	17.0	5.0	\$ 455.00	068-1145	068-1365
410.0	17.0	5.0	\$ 455.00	068-1147	068-1367
441.6	17.0	5.0	\$ 455.00	068-1150	068-1370
457.9	17.0	5.0	\$ 455.00	068-1160	068-1380
488.0	17.0	5.0	\$ 455.00	068-1170	068-1390
514.5	17.0	5.0	\$ 455.00	068-1180	068-1440
532.0	17.0	5.0	\$ 455.00	068-1185	068-1445
590.0	17.0	5.0	\$ 455.00	068-1190	068-1450
632.8	17.0	5.0	\$ 455.00	068-1220	068-1460
670.0	17.0	5.0	\$ 455.00	068-1230	068-1470
694.3	17.0	5.0	\$ 455.00	068-1240	068-1480
780.0	17.0	5.0	\$ 455.00	068-1250	068-1490
830.0	17.0	5.0	\$ 455.00	068-1260	068-1550
1064.0	17.0	5.0	\$ 455.00	068-1270	068-1560
1150.0	17.0	5.0	\$ 455.00	068-1275	068-1565
1300.0	17.0	5.0	\$ 455.00	068-1280	068-1570
1550.0	17.0	5.0	\$ 455.00	068-1290	068-1580

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Quartz Depolarizers

- Thoroughly scrambles a polarized beam to make it appear unpolarized
- Available in both single and double wedge configurations
- Made from the finest optical quality crystalline quartz
- Single wedge form has transmission from 180nm to 4500nm
- Mounted in metal ring for convenience

These quartz wedges scramble the polarization of an impinging beam of light and render it substantially depolarized. We offer a single wedge and a double wedge. The single wedge introduces a deviation in the beam of light. By cementing two wedges together it is possible to reduce the beam deviation to less than 10arcmin. However, this is achieved at the expense of broad band transmission since an index-matched optical cement must be used. Both types are 17mm square and are mounted in a 30mm diameter metal cell.



Specifications & Tolerances

Dimensions: +0, -0.2mm

Material: Crystal quartz

Coating: 1 piece — none

2 piece — Single layer

Anti-Reflection

Parallelism: ≤ 5 arcsec

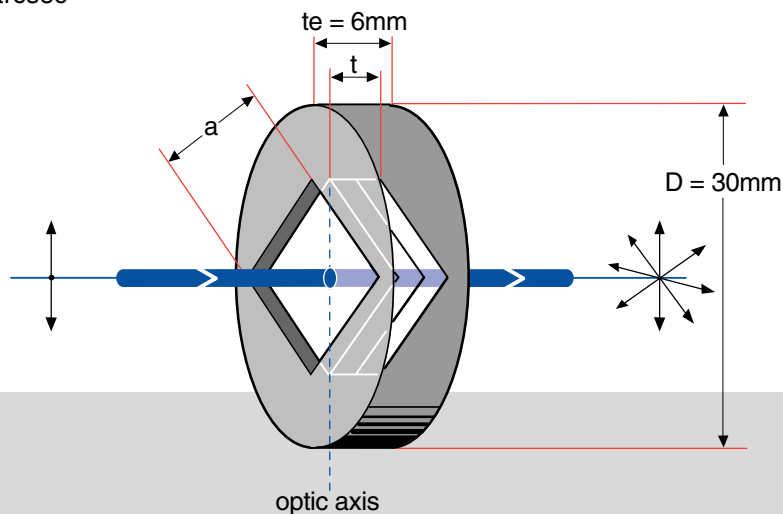
Surface flatness: $\lambda/10$

Retardation: $\lambda/2$

Mounting: Black finished aluminum

Wavelength range: 1 piece — 180-3500nm

2 piece — 350-2500nm



QUARTZ DEPOLARIZER

Quartz Depolarizers

Type Cell	Diameter, D (mm)	Side, a (mm)	Thickness, t (mm)	Price	PART NUMBER
1 piece	30.0	17.0	2.5	\$ 395.00	068-6690
2 piece	30.0	17.0	4.4	\$ 445.00	068-6770

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

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Filter & Apertures

'Depolarizers' should probably be more properly called 'randomizers' since they do not, in fact, depolarize a beam. Rather they cause the beam to be made up of a large range of continuously varying and intermixed polarization angles. This is usually entirely satisfactory for most applications - but care should be taken to not restrict the aperture for this will reduce the effect considerably.

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