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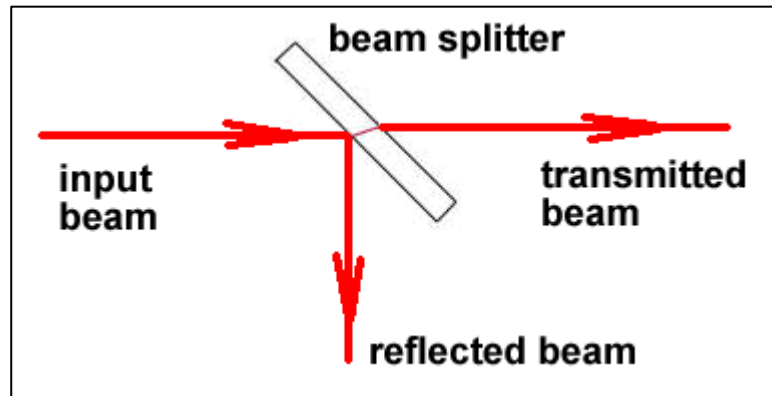
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Beam Splitters

Beam splitters allow a beam to be split into two beams of differing power, however, the most popular power split is 50:50 at a 45° incidence angle. The polarization needs to be considered when specifying a beam splitter otherwise the reflected and transmitted beams will not have the correct power. We have developed a special 'polarization insensitive' coating which eliminates this problem for the 50:50 case.

- Advanced in-house design
- Up to 500W/cm² power handling
- High quality laser grade material

The following standard beam splitter are available.



| Model | Material | Diameter mm | ET mm | Transmission % | Reflectance % | Coating |
|-------------------|----------|-------------|-------|----------------|---------------|------------|
| BPZ-1-3-45 | ZnSe | 25.4 | 3 | 50 | 50 | AR/50%-PIB |
| BPZ-1-3-50-P | ZnSe | 25.4 | 3 | 50 | 50 | AR/50%-45P |
| BPZ-1-3-50-R | ZnSe | 25.4 | 3 | 50 | 50 | AR/50%-45R |
| BPZ-1-3-45-3-50-S | ZnSe | 25.4 | 3 | 50 | 50 | AR/50%-45S |
| BPZ-1-3-99-R | ZnSe | 25.4 | 3 | 1 | 99 | AR/99%-45R |
| BPZ-1.5-3-45 | ZnSe | 38.05 | 3 | 50 | 50 | AR/50%-PIB |
| BPZ-1.5-4-45 | ZnSe | 38.05 | 4 | 50 | 50 | AR/50%-PIB |
| BPZ-1.5-3-10-R | ZnSe | 38.05 | 3 | 90 | 10 | AR/10%-45R |
| BPZ-1.5-3-1-R | ZnSe | 38.05 | 3 | 99 | 1 | AR/1%-45R |
| BPZ-1.5-3-50-P | ZnSe | 38.05 | 3 | 50 | 50 | AR/50%-45P |
| BPZ-1.5-3-50-R | ZnSe | 38.05 | 3 | 50 | 50 | AR/50%-45R |
| BPZ-1.5-3-50-S | ZnSe | 38.05 | 3 | 50 | 50 | AR/50%-45S |
| BPZ-1.5-3-5-R | ZnSe | 38.05 | 3 | 95 | 5 | AR/5%-45R |
| BPZ-1.5-4-50-R | ZnSe | 38.05 | 4 | 50 | 50 | AR/50%-45R |
| BPZ-1.5-5-50-R | ZnSe | 38.05 | 5 | 50 | 50 | AR/50%-45R |
| BPZ-2-5-50-R | ZnSe | 50.8 | 5 | 50 | 50 | AR/50%-45R |
| BPZ-2-5-45 | ZnSe | 50.8 | 5 | 50 | 50 | AR/50%-PIB |

Remark:

- 1) The above items are flat/flat;
- 2) The angle of incidence is 45 degree;
- 3) The above items are polarisation-insensitive.

Windows

ZnSe windows can be fabricated in dimensions from 4.0mm to 300mm diameter, and in thicknesses from 1.0mm up to 50mm. The windows are AR coated at 10.6um. Many standard sizes are manufactured and held in stock.

- Hi-tech manufacturing methods
- Latest ultra-low absorption coatings
- High quality laser grade material

The following standard windows are available.

| Model | Material | Diameter mm | ET mm | Incidence deg | T % | R % | Coating |
|-----------|----------|-------------|-------|---------------|------|------|---------------|
| WZ4920 | ZnSe | 12.5 | 2 | 0 | 99.4 | 0.1 | AR/AR |
| WZ5030 | ZnSe | 12.7 | 3 | 0 | 99.4 | 0.1 | AR/AR |
| WZ5910 | ZnSe | 15 | 1 | 0 | 99.4 | 0.1 | AR/AR |
| WZ5960U | ZnSe | 15 | 6 | 0 | 71 | 14.5 | Uncoated ZnSe |
| WZ6330 | ZnSe | 16 | 3 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1020 | ZnSe | 25.4 | 2 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1030 | ZnSe | 25.4 | 3 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1030U | ZnSe | 25.4 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| WZ1040 | ZnSe | 25.4 | 4 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1130 | ZnSe | 28 | 3 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1140 | ZnSe | 28 | 4 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1150 | ZnSe | 28 | 5 | 0 | 99.4 | 0.1 | AR/AR |
| WZ11830U | ZnSe | 30 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| WZ1530 | ZnSe | 38.05 | 3 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1530P | ZnSe | 38.05 | 3 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1540 | ZnSe | 38.05 | 4 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1550 | ZnSe | 38.05 | 5 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1560 | ZnSe | 38.05 | 6 | 0 | 99.4 | 0.1 | AR/AR |
| WZ17580 | ZnSe | 44.5 | 8 | 0 | 99.4 | 0.1 | AR/AR |
| WZ19730 | ZnSe | 50 | 3 | 0 | 99.4 | 0.1 | AR/AR |
| WZ19740 | ZnSe | 50 | 4 | 0 | 99.4 | 0.1 | AR/AR |
| WZ19750 | ZnSe | 50 | 5 | 0 | 99.4 | 0.1 | AR/AR |
| WZ1975099 | ZnSe | 50 | 5 | 0 | 1 | 99 | AR/99% |
| WZ2030U | ZnSe | 50.8 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| WZ2040 | ZnSe | 50.8 | 4 | 0 | 99.4 | 0.1 | AR/AR |
| WZ2050 | ZnSe | 50.8 | 5 | 0 | 99.4 | 0.1 | AR/AR |
| WZ2050U | ZnSe | 50.8 | 5 | 0 | 71 | 14.5 | Uncoated ZnSe |
| WZ2060 | ZnSe | 50.8 | 6 | 0 | 99.4 | 0.1 | AR/AR |
| WZ2530 | ZnSe | 63.5 | 3 | 0 | 99.4 | 0.1 | AR/AR |
| WZ3030 | ZnSe | 76.2 | 3 | 0 | 99.4 | 0.1 | AR/AR |

Brewster Windows

Brewster windows operate at an angle of incidence equal to the 'Brewster angle' which is 67.4 for ZnSe at 10.6mm. In order to present a square profile to the incident beam, they are about 2.5 times longer than their width. They fully transmit linearly polarized light in the P-plane and reflect about 50% of the S-plane component. Consequently, they can be used to enhance ('clean-up') the polarization or by rotating it about the beam axis, they can be used as an attenuator. Coated versions enhance the reflectance of the S-component but at the expense of restricting the power. Usually, Brewster windows are used in pairs.

- Wedged to between 1 and 3 arcminutes in order to overcome multiple interference
- Coated or uncoated versions and many sizes available
- High quality laser grade material

The following standard Brewster windows are available.

| Model | Material | Diameter mm | ET mm | Incidence deg | T % | R % | Coating |
|----------|----------|-------------|-------|---------------|-----------|-----------|---------------|
| BWZ2510 | ZnSe | 25 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZ3315 | ZnSe | 33 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZE4015 | ZnSe | 40 | 3 | 67.4 | 98% P-Pol | 99.5S-Pol | AR/U-EB |
| BWZ4218 | ZnSe | 42 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZ5018 | ZnSe | 50 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZE5018 | ZnSe | 50 | 3 | 67.4 | 98% P-Pol | 99.5S-Pol | AR/U-EB |
| BWZ5320 | ZnSe | 53 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZ6122 | ZnSe | 61 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZ6323 | ZnSe | 63 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZ6625 | ZnSe | 66 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZE6625 | ZnSe | 66 | 3 | 67.4 | 98% P-Pol | 99.5S-Pol | AR/U-EB |
| BWZ10038 | ZnSe | 100 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZ11542 | ZnSe | 115 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |
| BWZ13248 | ZnSe | 132 | 3 | 0 | 71 | 14.5 | Uncoated ZnSe |

Beam Combiner

Beam Combiners are ideal for applications where diode lasers are being used for system alignment. Designed for used at 45 degree, they transmit the long wavelength beam and align it with the 90 degree reflected diode beam.

1. Beam Combiner for CO₂ Laser (wavelength 10.6um)

Average transmission > 99%@10.6um, Average reflection > 85%@650nm (or 633nm)

Diameter Tolerance: +0/-0.13mm

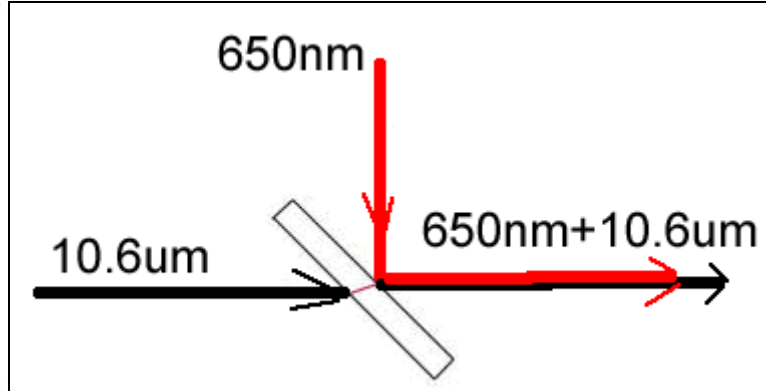
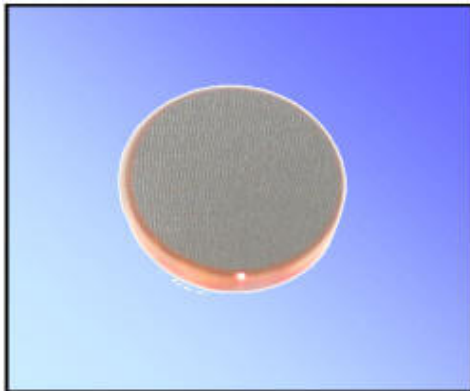
Thickness: ±0.25mm

Side1: T>99%@10.6um, 45AOI

Side2: T>99%@10.6um R>85%@650nm or 633nm 45AOI

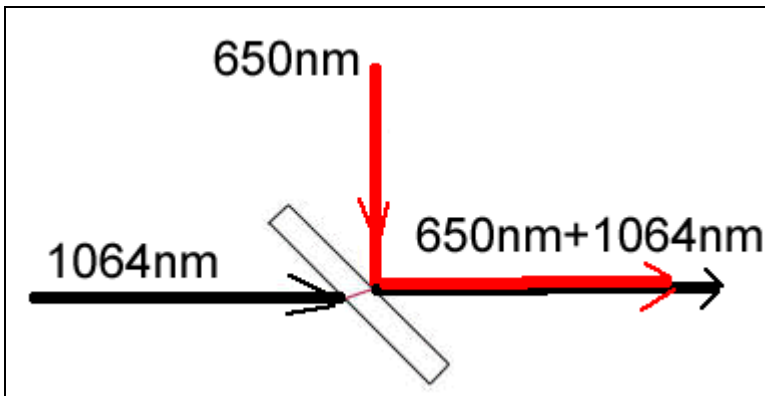
Flatness: $\lambda/20$ @10.6um

| Part No. | Material | Diameter (inch) | Thickness (mm) | Remark |
|-----------------|----------|-----------------|----------------|----------------------|
| BCZ-0.5-2-650 | ZnSe | 0.5 | 2 | MaxT10.6μm/MaxR650nm |
| BCZ-0.75-2-650 | ZnSe | 0.75 | 2 | MaxT10.6μm/MaxR650nm |
| BCZ-1.0-3-650 | ZnSe | 1.0 | 3 | MaxT10.6μm/MaxR650nm |
| BCZ-1.1-3-650 | ZnSe | 1.1 | 3 | MaxT10.6μm/MaxR650nm |
| BCZ-1.5-3-650 | ZnSe | 1.5 | 3 | MaxT10.6μm/MaxR650nm |
| BCZ-1-3-9.4-650 | ZnSe | 1.0 | 3 | MaxT9.5μm/MaxR650nm |
| BCZ-20-2-650 | ZnSe | 20mm | 2 | MaxT10.6μm/MaxR650nm |
| BCZ-0.5-2-633 | ZnSe | 0.5 | 2 | MaxT10.6μm/MaxR633nm |
| BCZ-0.75-2-633 | ZnSe | 0.75 | 2 | MaxT10.6μm/MaxR633nm |
| BCZ-1-3-633 | ZnSe | 1 | 3 | MaxT10.6μm/MaxR633nm |
| BCZ-1.5-3-633 | ZnSe | 1.5 | 3 | MaxT10.6μm/MaxR633nm |



2. Beam Combiner for Nd:YAG Laser (wavelength 1064nm)

Average transmission > 99%@1064nm, Average reflection > 85%@650nm



Diameter Tolerance: +0/-0.13mm

Thickness: ±0.25mm

Side1: T>99%@1064nm, 45AOI

Side2: T>99%@1064nm, R>85%@650nm, 45AOI

Flatness: $\lambda/2$ @1064nm per 25mm dia

| Part No. | Material | Diameter (inch) | Thickness (mm) |
|--------------|----------|-----------------|----------------|
| BCBK-0.5-2 | BK7 | 0.5 | 2 |
| BCBK-0.75-2 | BK7 | 0.75 | 2 |
| BCBK-0.75-3 | BK7 | 0.75 | 3 |
| BCBK-1.0-3 | BK7 | 1.0 | 3 |
| BCBK-1.0-3.4 | BK7 | 1.0 | 3.4 |
| BCBK-1.1-3 | BK7 | 1.1 | 3 |
| BCBK-1.5-3 | BK7 | 1.5 | 3 |

3. Beam Combiner for Green Laser (532nm)

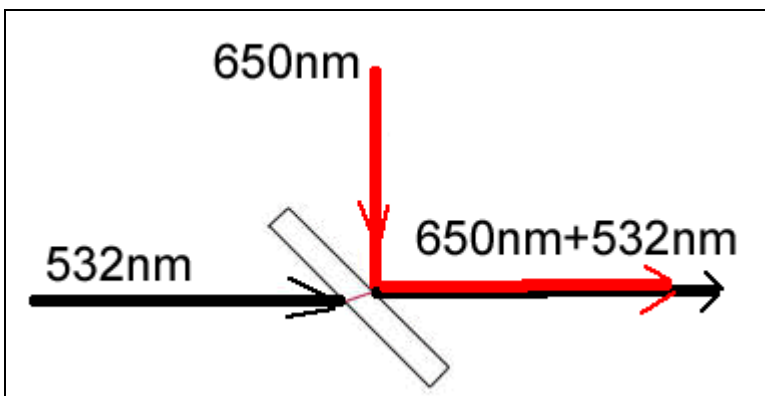
Diameter Tolerance: +0/-0.13mm

Thickness: ±0.25mm

Side1: T>99%@532nm, 45AOI

Side2: T>99%@532nm, R>85%@650nm, 45AOI

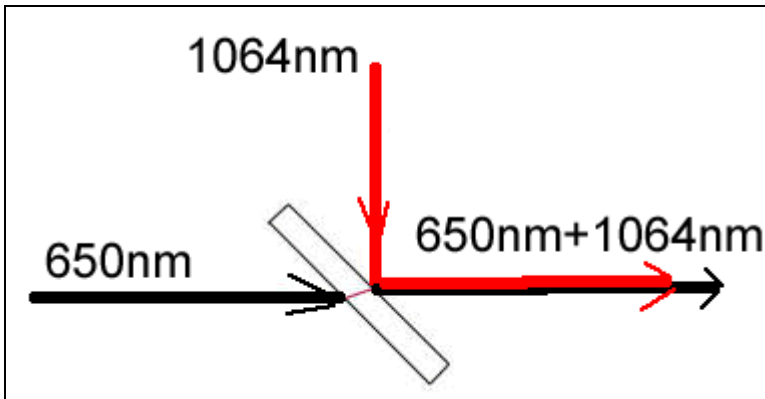
Flatness: $\lambda/2$ @560nm per 25mm dia



| Part No. | Material | Diameter (inch) | Thickness (mm) |
|-------------------|----------|-----------------|----------------|
| BCBK-1-3-532T650R | BK7 | 1 | 3 |

4. Reverse Beam Combiner

Reverse YAG Beam Combiner refers to an optic component used to transmit a short wavelength beam (eg. 650nm) at an angle of incidence of 45° while reflecting a long wavelength 1064nm.



Diameter Tolerance: +0/-0.13mm

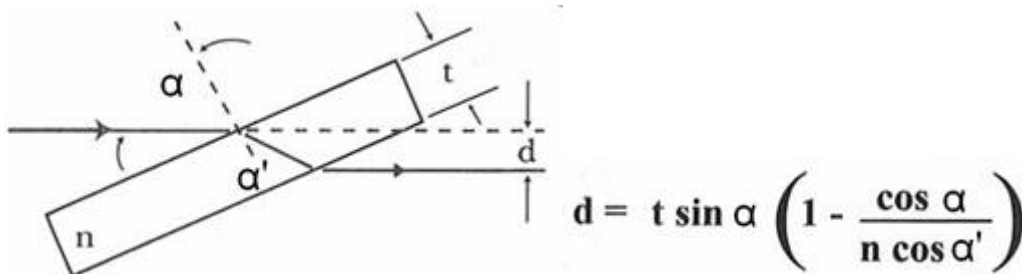
Thickness: ±0.25mm

Side1: T>99%@650nm, 45AOI

Side2: T>99%@650nm R>99%@1064nm, 45AOI

Flatness: $\lambda/2$ @1064nm per 25mm dia

| Part No. | Material | Diameter (inch) | Thickness (mm) |
|-------------------|----------|-----------------|----------------|
| BCBK-1-3.5-1064R | BK7 | 1 | 3.5 |
| BCBK-1-7-1064R | BK7 | 1 | 7 |
| BCBK-2-6.35-1064R | BK7 | 2 | 6.35 |



Where,

- α is angle of incidence
- n is index of refraction
- t is thickness
- d is displacement of the material

For example: BCZ-1-3, $d=1\text{mm}$; BCBK-1-3, $d=0.8\text{mm}$