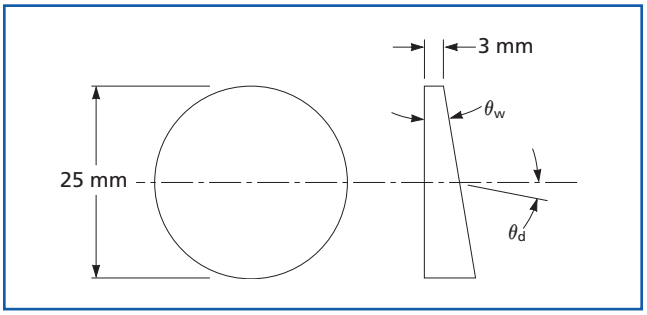
Wedge Prisms

Wedge prisms are used as beamsteering elements in optical systems.

- The apex angle is manufactured to tight tolerances.
- Antireflection coatings can be ordered by appending the coating suffix to the product number. (See Chapter 5, *Optical Coatings*.)



02 PRW wedge prisms

SPECIFICATIONS: WEDGE PRISMS

Surface Flatness:
λ/4 at 632.8 nm over central 90% of edge dimension
Clear Aperture: 22.5 mm
Optical Material: BK7
Coatings: Optional
Wedge Angle Tolerance: $\theta_w \pm 30$ arc seconds
Nominal Deviation for 633 nm: θ_d
Power (in diopters): Δ (see table below)
Surface Quality: 60-40 scratch and dig
Dimension Tolerance: ±0.2 mm

Wedge Prisms

θ_w	θ_d	Δ	PRODUCT NUMBER
1°56′	1°	1.75	02 PRW 001
3°52′	2°	3.50	02 PRW 003
7°40′	4°	7.00	02 PRW 005
11°21′	6°	10.50	02 PRW 007
14°51′	8°	14.00	02 PRW 009
18°8′	10°	17.60	02 PRW 011

Note: For coatings, append coating suffix.

APPLICATION NOTE

Wedge Prisms

The wedge apex angle necessary to produce a given minimum deviation or deflection (d for a ray passing through the wedge) is determined by

$$\theta_w = \arctan\left[\frac{\sin\theta_d}{n - \cos\theta_d}\right]$$

where n is the refractive index.

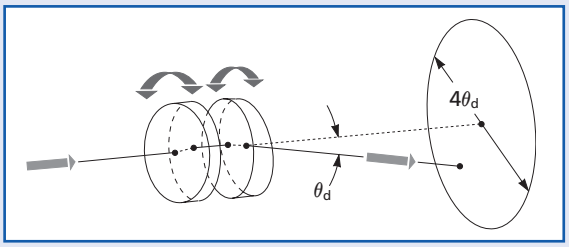
Power (Δ) of a prism is measured in diopters and is defined as the deflection of one centimeter at a distance of one meter from the prism. Thus

$$\Delta = 100\tan(\theta_d).$$

By combining two wedges of equal power in near contact, and by independently rotating them about an axis parallel to the normals of their adjacent faces, a ray can be steered in any direction within the narrow cone. The deviation angle is specified with the assumption that the input beam is normal to the perpendicular face. Deviation will change with input angle. The equation used to determine the deviation angle for the same input direction but other wavelengths is

$$\theta_d = \arcsin(n\sin\theta_w) - \theta_w$$

where θ_d is the deviation angle, θ_w is the wedge angle, and n is the nominal index for BK7 at the appropriate wavelength.



Wedge prisms used in beamsteering application