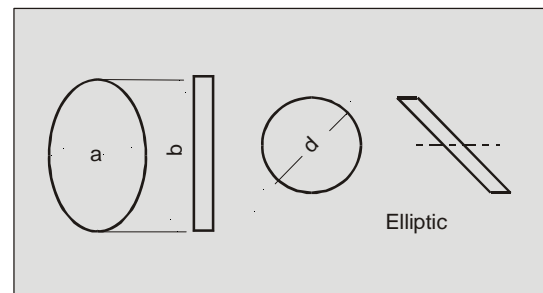
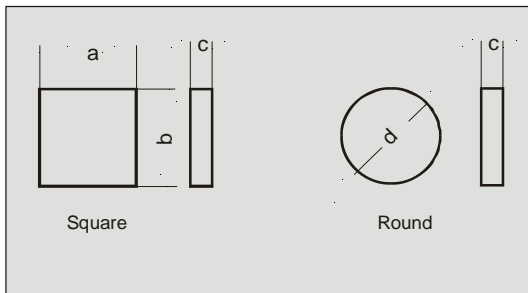
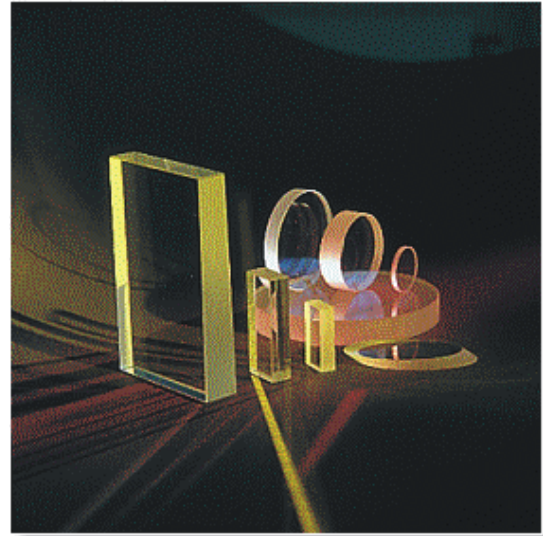


5. Plane plates

5.1. Plane parallel plates

Plane parallel plates are used in optical systems as windows, parallel beam displacement elements, (see chapter 8 for multiplate polarizers), or substrates for thin film coatings. Depends on kind of used coating plane elements can work as mirrors, filters, beam splitters, polarizers or windows with antireflective properties. Special kind of plane plates are the reference flats, used as the standards of flatness or parallelism of surfaces. We can deliver plane parallel plates of different dimensions and shapes. Examples of plane parallel plates are on the drawings below.



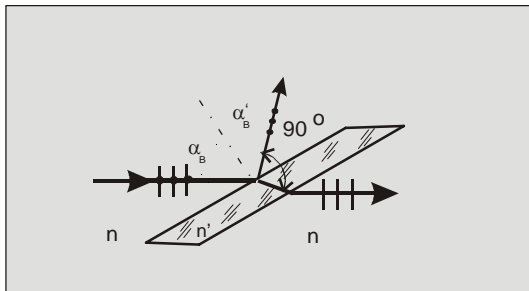
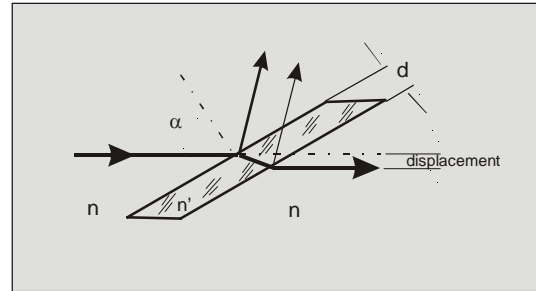
Technical specification-plane plates

	Standard
Substrate material	on request
Size range	4 – 200 mm
Size tolerance	-0,1 mm ÷ (-0,5)
Clear aperture	90 %
Thickness tolerance	± 0,1 mm
Flatness (633 nm)	1 λ per inch
Surface finish (Digs - Scratches)	60 – 40
Parallelism	3 ÷ 10 arc min
Coatings	on request

According to customer specification, we can deliver non-standard plane plates with significantly higher optical parameters: 10-5; $\lambda/20$ (633nm) 1 arc sec, for example. Plates in mountings – also if requested.

5.2. Windows / Brewster windows

Optical windows are used mainly for protection of optical systems against dust and damage. They are also used in optics for separation of different environments. Specification for windows is the same as for plane parallel plates. Surfaces of the windows which are used in nonpolarized light can be coated by suitable antireflection coatings to decrease reflection losses. — (see chapter 3).



In the case of polarized light, the window can be tilted at Brewster angle which makes that for the light beam polarized parallel to the plane of incidence, transmission can exceed nearly 100% without using antireflection coating. **Brewster windows** often have elliptical shape, which makes them easier to mount in holders.

Technical specification- windows

	Standard
Substrate material	on request
Size range	4 – 200 mm
Size tolerance	-0,1 mm ÷ (-0,5)
Clear aperture	90 %
Thickness tolerance	± 0,1 mm
Flatness (633 nm)	1 λ per inch
Surface finish (Digs - Scratches)	60 – 40
Parallelism	3 ÷ 10 arc min
Coatings	on request

According to customer specification, we can deliver non-standard window with significantly higher optical parameters: 10^{-5} ; $\lambda/20$ (633nm) 1 arc sec, for example. Windows in mountings – also if requested.

5.3. Optical wedges

Optical wedges are used in optical systems as beam steering elements. They operate as prisms with very small refracting angle γ , giving deflection of optical beam by:

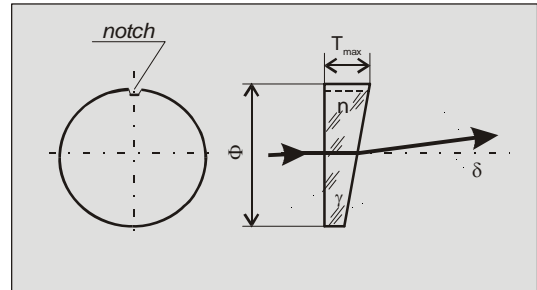
$$\delta = (n - 1) \gamma$$

where:

δ — angle of deflection,

γ — wedge angle,

n — index of refraction



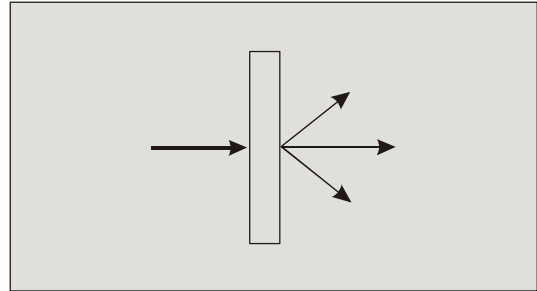
Wedges are often used as compensators, because by rotating them slightly it is possible to change the optical path lengths easily. It is possible in all the cases when only one optical surface should operate, and reflection from the second one is not desired.

Technical specification- wedge plates	
	Standard
Substrate material	on request
Size range	4 – 200 mm
Size tolerance	-0,1 mm ÷ (-0,5)
Clear aperture	90 %
Thickness tolerance	± 0,1 mm
Flatness (633 nm)	1 λ per inch
Surface finish (Digs - Scratches)	60 – 40
Wedge angle tolerance	+/- 10 arc min
Coatings	on request

According to customer specification, we can deliver non-standard wedge plates with significantly higher optical parameters: 10-5; $\lambda/20$ (633nm) 1 arc sec, for example. Wedges in mountings – also if requested.

5.4. Ground glass diffusers (Dispersion plates)

Dispersion plates are used for increasing homogeneity of illumination in illuminating systems and as focus or screen plates for the observation of real images in an optical beam path. Our diffusers are one side fine ground glass plates, and are perfect for all these purposes.



Technical specification- diffusers	
	Standard
Substrate material	B270
Size range	4 – 200 mm
Size tolerance	-0,1 mm ÷ (-0,5)
Clear aperture	90 %
Thickness tolerance	± 0,1 mm

According to customer specification, we can deliver non-standard ground diffusers, made of quartz glass, with requested shape or other optical parameters. Dispersion plates in mountings – also if requested.