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Components & Assemblies

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You tell us what you want, and we manufacture it to your specification, budget and requirements.

## Achromatic doublets

The **achromatic** lens is one made specifically to limit the effects of spherical and chromatic distortion. Such lenses are corrected to bring two wavelengths into focus in the same plane, these wavelengths usually being blue and red.

The most common type of **achromat** is the **doublet**. This is formed from two individual lenses, each lens having a different dispersion level.

The **concave** lens is made from flint glass, which has relatively high dispersion, while the other lens (**convex**), is made from crown glass, and has lower dispersion. The two elements are then mounted together (usually cemented), then shaped so that the aberration of one is countered by that of the other.

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## Concave mirrors

The **concave**, or converging **mirror**, has a reflecting surface which bulges inwards. A **concave mirror** will show a different type of image depending on the distance between the mirror and the object being viewed.

They are described as 'converging' because they refocuse the parallel light that falls on them toward a single focus.

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## Convex mirrors

The **convex**, diverging or fisheye **mirror**, has a reflecting surface which bulges outwards towards the light source.

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## Diffusers

The **diffuser** is so named because it spreads or scatters light, creating a softer, unfocused light.

Various methods may be used, such as ground glass, teflon, holography and opal or greyed glass.

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## Lenses

**Lenses** are typically defined by the curvature of the two **optical** surfaces.

**Biconvex or double convex:**
both surfaces are convex (bulging outwards).

**Biconcave:**
both surfaces are concave (bulging inwards).

**Plano-convex:**
one flat surface, the other convex.

**Plano-concave:**
one flat surface, the other concave.

**Convex-concave or positive-negative meniscus:**
one surface is convex and the other concave. Most often used in corrective lenses.

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## Optical flat mirrors

**Optical flat mirrors** are lapped and polished on one or both sides to withing extremely fine tolerances, usually just a few millionths of an inch, resulting in extremely flat surfaces.

A monochromatic light is then used with the mirror to gauge the flatness of another surface by measuring the levels of interference.

Such interference may be seen in the tiny gap between the two surfaces (of the mirror and the surface being measured).

**Optical flat mirrors** are often given coating and used as **precision mirrors** for special purposes. They are also used in the field of spectrophotometry.

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## Prisms

The **prism** has flat, polished surfaces that refract light. The angles between the surfaces may be varied to suit the purpose.

Used to split light into its constituent spectral colours (the colours of the rainbow). **Prisms** can also be used to reflect light, or to split light into components of differing polarity.

Light changes speed as it passes from air into the glass of the prism, and again on exiting the prism. This causes the light to refract, entering the new medium at a different angle.

The light will bend to a degree which is dependant on the angle that the original beam of light makes with the surface, and on the ratio between the refractive indices of the air and glass.

The refractive index of the prism glass will vary with the wavelength or color of the light used - this is commonly known as dispersion, causing light of different colors to be refracted differently and to leave the prism at different angles, creating a rainbow effect.

The prism may be used for internal reflection at the surfaces rather than for dispersion. Light hitting an inside surface at sufficiently steep angles, causes total internal reflection, reflecting all of the light. The prism is therefore sometimes considered a useful substitute for a mirror.

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