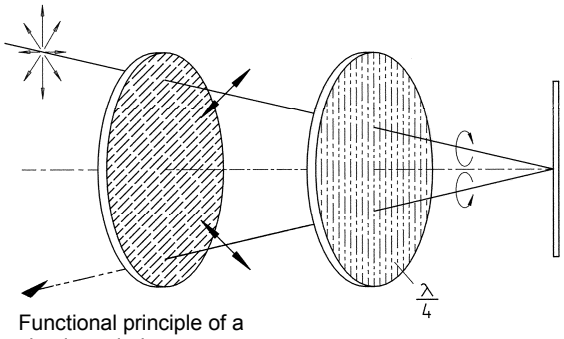
Information B+W

The Physics behind Polarisation

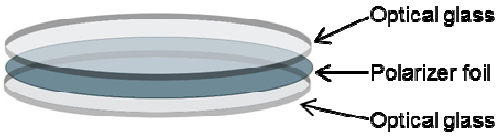
Light - we can imagine it as particles of light (photons) moving as waves in straight lines - oscillates in a completely random manner in most cases. By means of a polariser (polarising filter), we can suppress any selected direction from this unpolarised light. The light then vibrates in only one plane, as illustrated by the graph. In the circular polarising filter, an additional retardation film, shown in the image as λ/4, is added after the linear filter. The retardation film causes the linearly polarised light to rotate, and faulty measurements are thus prevented in modern cameras with internal optical measurement systems such as autofocus and exposure metering.



Functional principle of a circular polarizer

A polarising filter can be thought of as a device with many bars that are placed parallel and very close to one another. The polarisation layer only works when the molecules of the plastic (e.g. PVA, polyvinyl alcohol) or crystals have been brought into a uniform orientation by stretching or pulling from one side. If the grating is vertical, only the vertically vibrating particles can pass through, and the horizontally vibrating particles are held back because of their amplitude in this direction, which is too large. Thus, only those photons that are oscillating in the favourable orientation in each case can pass. A polarising filter is therefore different from a color filter in that it absorbs light oscillation directions instead of light wavelengths (light colors).

The action of the polarisation effect always stems from the polarising film. This can be seen in the illustration, cemented (bonded) between two cover glasses. B+W polarising filters are then fine-ground and polished, which gives them their excellent optical suitability (quality). A high-quality B+W coating rounds off the quality of a B+W polarising disc.



Profile of a B+W Polarizer glass

Jos. Schneider Optische Werke GmbH
Ringstraße 132
55543 Bad Kreuznach
Germany
Phone +49 671 601-125
Fax +49 671 601-81 – 125
www.schneiderkreuznach.com/fotofilter
filter@schneiderkreuznach.com