

FILTER HANDBOOK

B+W FILTERS

B+W





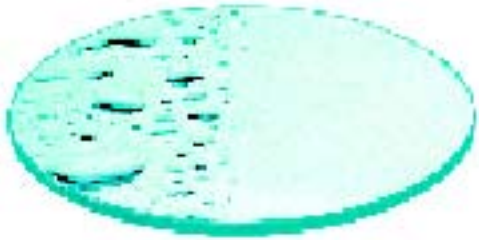
Computer-controlled manufacturing processes safeguard the high level of B+W quality



Only the best optically homogeneous optical glasses are used in B+W filters



B+W employs cutting edge vacuum coating equipment for coating its filters



Quality filters from B+W: Tradition & Innovation “Made in Germany”

The B+W filter manufacturing company was founded in Berlin in 1947 by business partners Biermann and Weber. In 1985 the merger with the Jos. Schneider Optical Works in Bad Kreuznach expanded the B+W line of products with optical filters for science and technology. It also generated significant progress in multi-layer coating systems (MC). As a result, B+W became the first manufacturer of filters in the world to offer the innovative water- and dirt repelling MRC multi-layer coating process, which, in addition to its reflection-preventing qualities is also regarded as being especially scratch-resistant.

Filters solve a great variety of tasks in photography. They match the illumination to the type of color film; they enhance contrast and colors; they attenuate the amount of incoming light; they can make the structures invisible to our eyes visible to the film; and they offer numerous optical effects for creative composition or for abstractions. Filters make it possible to achieve photographs that simply could not be made without them, and many of them could not be accomplished with subsequent digital image manipulation! The same applies to direct digital photography. B+W therefore provides digital imaging filters in diameters and designs suitable for lenses on most current digital cameras and camcorders.

In order to deliver optimal image quality and to safeguard the high demands of lens/camera manufacturers, B+W glass filters are manufactured virtually exclusively from glass supplied by the German Schott Group.

In Bad Kreuznach, the most modern fabrication machines produce highly precise filters in an impressive variety of types and diameters. Quality controls are integrated at all key stages of the production process, and a final inspection of every individual filter ensures the renowned high B+W quality standard. At B+W, our commitment to our guarantee and service are taken seriously. Continuous improvements and new developments enable users to achieve their best possible images. By comparison, a cheap filter can reduce the imaging performance of a high-quality lens quite dramatically! Therefore, consider the quality of a filter as seriously as you would consider the choice of your lenses – look for the B+W brand, because the quality of the image depends upon what is in front of the lens!



Strict controls at all stages of production from design to the final checkout ensure full performance for optimal imaging quality

Our Range of Products

(Some products may not be available in your country)



B+W Filters

The leading brand for demanding professionals and amateur photographers for creative imaging with optimal quality. Choose from correction and effect filters for color and black-and-white photography; Käsemann polarizing filters; close-up lenses; special-effect and trick lenses; filters with SLIM mounts for vignetting-free exposures with wide-angle zoom- and fixed focal length lenses.



Photo Optics

Absolutely state of the art taking and enlarging lenses for all fields of application of professional analog and digital photography, from 35 mm to large format.



CCTV/Machine Vision/OEM

Specialty lenses corrected for the infrared range, high-resolution C-mount lenses and macro systems for image processing and for non-contact measurement technology as well as customer-specified design and fabrication of optical and mechanical components.



Cine Projection

High-performance motion picture projection lenses for 16 mm, 35 mm and 70 mm films, anamorphic projection attachments, wide-angle projection lenses for 70 mm films with 8 or 10 perforations per frame, test films for 35 mm projection.



Digital Projection

New Cine-Digital line of projection lenses in a large variety of closely stepped fixed focal lengths for digital high-performance projectors and anamorphic attachments, with guaranteed high contrast and sharp detail rendition. Their fields of application range from digital cinemas to fixed installations in front and rear projection, all the way to rental and staging applications.



Ophthalmic Optics

Glass- and plastic lenses for eyeglasses; single- and multiple strength lenses, gradient lenses of high-refractive materials with special glass geometry for better appearance and greater wearing comfort.



Servo Hydraulics

Electro-hydraulic and electro-pneumatic servo valves with high-grade electronic control units for precise positioning-, speed-, power- and pressure controls in mechanical engineering.

LIGHT, COLOR, FILTER EFFECTS

Light, wavelength and color

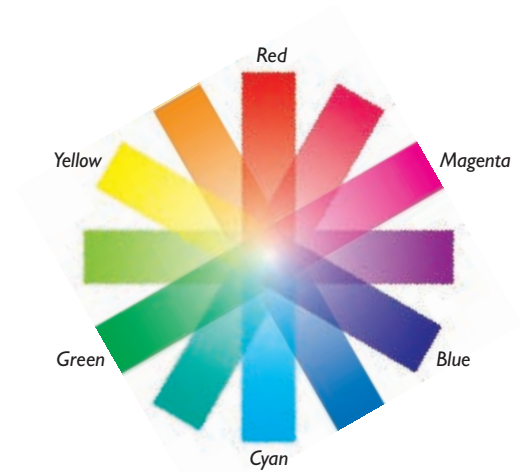
Light is an electromagnetic phenomenon with many facets. It travels with unimaginable high speed and it transports energy – even through completely empty space. Light can traverse “transparent” materials and in the process be diverted from its straight path, be reflected diffusely or directly, be absorbed and a blend of frequencies can be altered through absorption yielding a new balance of color. Light has fascinated generations of physicists and enabled astronomers to discover the secrets of outer space at distances that are far beyond our reach and our capacity of imagination. Light is the medium with which we “create ourselves a picture”.

The nature of light is so complex that we require two different physical models in order to explain its qualities that sometimes appear to be contradictory. When reacting with matter, light can behave as if it consisted of tiny particles (“photons”) that zip through space and which upon impact produce a “photo effect” reaction, which is the basis of the function of an exposure meter or digital camera sensor. However, it also behaves like a wave phenomenon that spreads in space in a spherical manner, consisting of interwoven electrical and magnetic fields that vibrate at right angles to each other. The number of these vibrations per second (on the order of 600,000,000,000,000) is just as unimaginable as the spreading speed of light (nearly 300,000 km or 186,411 miles per second). We are able to visualize the wavelengths of these vibrations: circa 380 nm to 750 nm (nanometers), or approximately 1/2000 of a millimeter. We perceive the different wavelengths as different colors: the shortest ones as violet, then blue, green, yellow, orange, red and the longest wavelengths as purple-red. And white light is nothing more than an even mixture of all these colors in the same proportion as we receive it from the sun.

Reflection properties define the color of an object

An object that is struck by light can reflect that light (nearly) completely, partially or (nearly) not at all. If it reflects all the wavelengths, i.e. colors, uniformly and nearly completely, the object appears to us as white. If it reflects them uniformly but only partially, the object will appear to us as gray under white light, and

when it reflects hardly anything, we perceive it as being black. Most objects, however, do not reflect all colors uniformly, some of them are reflected more strongly, others less strongly or not at all. The surface of the object will then no longer appear to us as being white or neutral gray, but colored, usually in a “mixed color”.



Additive and subtractive color mixig

A spread of the various component colors of white (or any) light is called its spectrum. In nature, we can see a spectrum in the form of a rainbow. Rainbow colors are pure colors, because each color can be defined by a specific wavelength. On the other hand, an object that appears green, for example, does not necessarily reflect just one wavelength or of a narrow band of wavelengths. It also may absorb a variety of frequencies, significantly blue and red. It reflects the remaining spectral colors, this mixture of which is perceived by us as that shade of green. If we replenish this mixture of colors with the missing shade of magenta, we will once again see white. Such opposite colors, when combined form white, are called complementary colors. Other examples are yellow and blue or red and cyan.

When light of one color is added to light of another color, this is called “additive color mixing”. As an example, this is the case when a red spotlight and a green spotlight illuminate a stage and we see yellow light as the combined (= added) color where the two spotlights overlap. But if we mix colored pigments, or if we paint or print colors over each other, something different happens: each colored pigment absorbs the part that is complementary to its own col-

B+W FILTER TECHNOLOGY

or. In other words, it takes away something from white light, so that less light is reflected than it would be by each color individually. Therefore this kind of color mixing is called “subtractive color mixing”. If we once again mix red and green, but in the “subtractive” manner just mentioned, for instance with watercolors, the resulting mixture will not be brighter than each individual color and yellow as it was with the spotlights, but darker and brown-black.

The effect of color filters

Colored filter glass absorbs a certain portion of its complementary color from the incoming light and lets the rest pass through. A yellow photographic filter, for example, absorbs part of the blue component of light and lets the rest, which is a mixture of all the other colors, appear as yellowish. For certain technical applications, however, there are special “yellow” filters (narrow band pass filters) that absorb not only a portion of the blue light, but all colors other than yellow. When colored light instead of white light passes through a yellow filter for black-and-white photography, a portion of the blue component of the colorful mixture is absorbed and its brightness is altered. Photographed through a yellow filter, a blue sky is rendered noticeably darker, the gray values of green foliage and grass with low blue component are hardly changed at all, yellow- or orange-colored blossoms without a blue component do not lose any brightness, so that they appear lighter in relation to other colors that have been reproduced in darker shades. A filter in front of a lens therefore reduces the overall brightness in proportion to its density. This is taken into account and corrected automatically by TTL exposure metering.

B+W continues to maintain the cutting edge coating technology

Optical and mechanical quality

Because photographic filters are positioned in the image-forming optical light path, they should only have the labeled absorption characteristics and no other optical effects in order not to diminish picture quality. The surfaces must be precisely plano-parallel (without bulges and tapering), with perfect smoothness (irregularities lead to stray light and a soft focus effect), their glass must be optically homogeneous and completely clear (no striae or cloudiness), and their surfaces must be as free of reflections as possible (to avoid stray light and double-/ghost images).



The top priority of B+W is the utilizing the highest possible optical quality glass, as well as the highest quality filter mount

The most modern manufacturing technology

That is why professionals and photographic enthusiasts around the world insist on B+W quality filters. B+W has been manufacturing filters for the most diverse applications for more than 50 years. This extensive experience has produced a unique know-how in glass and optical anti-reflection coatings. This, in conjunction with Schott optical glasses, state-of-the-art finishing machines and continuous quality control lead to top products for the world market.

B+W FOR FILM & DIGITAL

Correction- and creative filters with a great variety of accessories for analog and digital photography

Filters are indispensable for serious photography. They can tailor the color temperature of the light to the type of film to correct color casts; increase color saturation and penetrate veils of haze; block sharpness-reducing as well as color shifting ultraviolet and infrared radiation; control the rendition of colors in terms of shades of gray on black-and-white films; reduce or increase contrast; eliminate or attenuate unwanted reflections or even enhance them if needed, and much more, as described on the pages that follow.

Dioptric lenses for close-up shots down to the range of macro photography; a great variety of trick-and special effects attachments; rigid and folding lens hoods; protective covers, adapter rings, special mounts for individual applications, filter cases and micro-fiber cleaning cloths complement the line of B+W filters.

The range of applications of B+W filters and accessories includes all analog and digital photography: rangefinder- and single lens reflex cameras, digital cameras; camcorders, and broadcast video; and cinematography.



B+W uses the very best glass and filter mounts, and machines them with CNC-controlled fabrication machines to make sure that filters, supplementary lenses, and special effects attachments perform their functions optimally without jeopardizing the image quality. This provides the tightest possible tolerances with stringent quality control at every stage of production.

B+W is especially proud of its modern coating technology: The MRC (Multi Resistant Coating) **MRC** technology that we've developed exclusively is not only an enhanced process that assures virtually complete elimination of surface reflections on both sides of each filter and thus leads to a maximization of light transmission. In addition, its extraordinary hardness minimizes scratching and its water- and dirt-repelling surfaces facilitate the care of filters.



Many effects that can be achieved during the original exposure cannot be achieved by subsequent digital imaging manipulation

A special line of B+W filters for the increasingly popular digital cameras

In digital photography, filters are also important tools for enhancing picture quality. In spite of the effects that can be applied with imaging control programs that allow subsequent corrections not possible with traditional photography, the basic rule is still valid: Picture information that is not present in the original photograph cannot be reconstructed later with a computer – unless they are “painted in”, which is not authentic. When UV- or IR radiation have caused a haze and lack of sharpness, it would be only remedially possible to counter this deterioration by bending the gradation curve (increasing contrast) and by artificial sharpness correction (unsharp masking). This method cannot efficiently duplicate the brilliance and detailed sharpness that a UV-/IR blocking filter in front of the lens would have preserved. If reflections on a pane of glass block the view of things behind it, even the most sophisticated image manipulation program cannot magically recreate information that's been lost, whereas a polarizing filter would have eliminated most of the reflections. And enhancing filters add specific enhancements that are unique and not duplicated in post-production imaging control.

The mount sizes and the design of **DIGITAL-PRO** filters from B+W are tailored specifically to digital cameras and camcorders. Their exterior chrome finish harmonizes perfectly with the trendy light colors of digital cameras and their optical quality is tailored to the high-resolution digital lenses.



Check to see if the digital camera that you are considering has a filter thread. If so, you will later be able to use high-grade filters to make corrections and to add creative effects.

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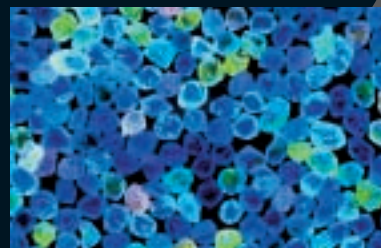
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