

R RODENSTOCK

Rodenstock Photo Optics – a brand of Qioptiq Photonics GmbH & Co. KG



Quality Filters

for digital and analog photography

List of Contents

The special features of Rodenstock Filters

Why Rodenstock Filters?	3
Properties and Quality of the Filter Glasses	4
Properties and Quality of the Coatings	5
The Water and Dirt Repellent Coating “super MC”	6
Properties and Quality of the Filter Frames	7

Description of the Different Rodenstock Filter Types

UV Blocking Filter (Series HR Digital and Digital pro)	8
Circular Polarizing Filter (Series HR Digital and Digital pro)	10
Neutral Density Filters ND 2x, ND 4x, ND 8x (Series HR Digital)	12
Variable Neutral Density Filter (Series Digital pro)	14
UV/IR Blocking Filter (Series HR Digital)	16
Skylight Filter (Series Skylight / Black & White)	18
Color Filter for Black and White Photos (Series Skylight / B & W)	20

Table of all Rodenstock Filters

Coatings, Frame Types and Available Thread Sizes	22
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Shop windows produce irritating reflections

A Rodenstock polarizing filter helps to get a clear view

Many corrections but not all filter

can be done with a computer by software, effects can be simulated this way.

Why Rodenstock Filters?

Filters can help produce better photos

Modern taking lenses produce sharp, high-contrast, true-color and distortion-free photographs. However, if ambient light is too bright for a low depth of field (e.g. for a high aperture) or for intentional motion blur (e.g. for a slow shutter speed), not even the best lens can help. It is no different if UV radiation falsifies colors and reduces contrast or if shiny surfaces produce irritating reflections. Or if colors are not converted into gray values in black-and-white images, on film or digitally, as the photographer actually wanted. Only filters can solve this problem.

However, the quality differences are huge

If you have spent a lot of money for a good lens, you do not want to run the risk of image quality losses due to inferior filters. For the filter is just as much a part of the optical beam path as the lens elements. The result is that

- Irregularities in the filter lens surfaces,
- Defective surface polishing and micro-scratches,
- Inhomogeneity of the filter lens (varying refractive index),
- A lack of blacking on the filter lens edge,
- A missing or insufficient coating, and
- Contamination (fingerprints, dust, drops of water)

cause general or partial blur, loss of contrast due to scattered light or ghost images just like corresponding deficiencies in the lens elements. An inferior filter frame can also have a negative effect with

- Too great a design height (vignetting of wide-angle shots),
- Insufficient blackening of the inside surfaces,
- Imprecise thread cutting (stiff movement, jamming), and
- Poor fit precision (risk of breakage, thermal expansion).

Filters therefore have to satisfy quality demands which are as high as those on lenses if they are not to impair the image quality.

Rodenstock guarantees the best possible filter quality

Rodenstock as a globally recognized manufacturer of professional lenses of the highest imaging quality knows just how important optical and mechanical quality is for filters. Rodenstock filters are therefore designed and produced with the same care as high-quality lenses; coatings are applied in state-of-the-art processes; and stringent test criteria are observed in quality control.

Rodenstock quality filters ensure that the expected filter effects are implemented to perfection and that sharpness and contrast of the lenses are maintained in full.

Optical Glass and Perfect Surface

High demands are made on optical glass

Filters have to be produced from optical glass of the same high quality as lenses; however, their specific filter effects may not have any other influence on the image.

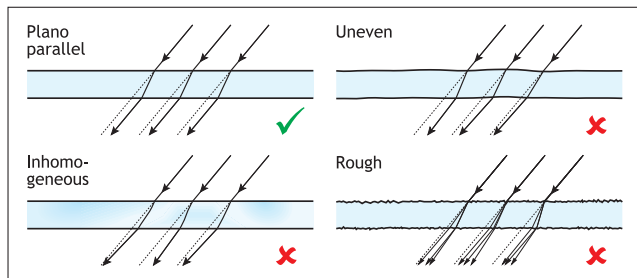
Optical glass for filters must meet very stringent demands so that the imaging quality of the lens is not impaired.

Light rays must remain parallel after passing through

The light rays incident into the filter are slightly refracted toward the optical axis at the front surface and away from the optical axis at the rear surface. To preclude the possibility of blur and loss of contrast, the direction of outgoing light must remain exactly parallel to that of incoming light at all points (see figure below):

1. The glass must be homogeneous, that is it must have exactly the same refractive index over its total surface.
2. Neither surface may be uneven or be tilted like a wedge toward the other; they must both be "planoparallel". Otherwise they will produce blur due to different light refraction.
3. The surfaces must be smooth and free of scratches. The polish must be equal to that of the surfaces of camera lens elements so as not to cause any contrast-reducing scattered light.
4. The transmission of the glass should be as high as possible in the visible spectral range. Nor may it show any inclusions of foreign particles such as bubbles or striae. This would have negative effects on the image contrast and on the resolution.
5. The mechanical strength should be high to allow a thin filter glass plate which is nevertheless break-resistant. Only then are shallow frames possible which avoid vignetting in wide-angle shots and which also still have a front thread.

This distinguishes good plano-parallel filter glass from poor filter glass



Extremely Flat Slimline Filter Frame

No risk of vignetting with wide-angle shots

The filter frame may not project too far beyond the front edge of the lens barrel so that the filter does not cause shading in the picture corners (vignetting) with wide-angle shots. All Rodenstock filters therefore have a very flat slimline frame. In order nevertheless to allow a screw thread for fastening a lens hood or a protective cap, the glass is only 1.4 mm thick.



All Rodenstock filters have a circumferential grooving at the front to allow easy screwing tight and unscrewing.

Brass frames for HR Digital, Skylight and Color Filters

The best material for filter frames is brass because it offers the best sliding properties when being screwed on or being unscrewed as well as high mechanical strength (filters in black and yellow boxes). The frames of the Rodenstock filter lines Digital pro and Digital Vario ND (filters in red boxes) are made of the somewhat lighter aluminum because these filter lines were designed for the best possible price/performance ratio.



Blackened glass edges reduce irritating scattered light

The edges of all Rodenstock filter lenses are blackened so that no contrast-reducing reflections are caused there. Together with the excellent coating, this produces the best possible image contrast.



Best Coatings for a high Contrast

All filters (except ND) should have high transmission

Although optical glass does not transmit 100% of light despite its high transmission, absorption does not play any role as filter glass plates are very thin. However, a smaller portion of light is reflected at any interface between air and glass. At a usual refractive index of $n = 1.52$, it will be around 8.3% for both sides; increasing up to 9% toward the short wavelengths (blue/blue violet). This reflected light reduces the useful brightness and can reduce contrast as scattered light if reflected a multiple of times.

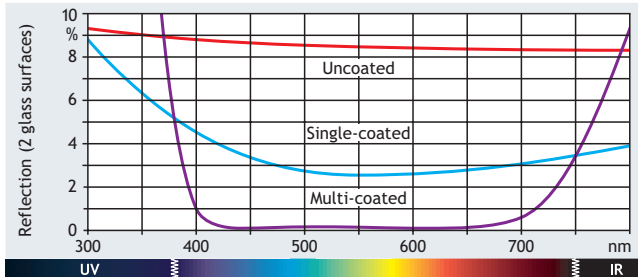
The reflection can be reduced for both sides of the filter glass together to around 2.5% for the medium range of the spectrum, with a slight rise to both sides, by vapor deposition of an exactly calculated, incredibly thin layer of a dielectric material of suitable refractive index, e.g. magnesium fluoride MgF_2 .

A multilayer coating (MC = multi-coating) of several dielectric layers of calculated thicknesses and refractive indices reflects even less, that is below 0.2%. Its reflection curve is moreover particularly uniform over almost the whole spectral range (see figure below).



On the left, a Rodenstock filter HR Digital UV with a highly efficient super MC coating; on the right a non-coated UV blocking filter. The left hand filter with only 0.2% reflection practically no longer shows any mirror effect.

Multi-coating reduces reflections to less than one thirtieth.



A Water and Dirt Repellent Coating

Filters remain clean longer and are easier to clean

Dirt on the front lens element or on a screwed on filter reduces the contrast. Fingerprints and water droplets have a soft-focus effect. Careful cleaning is therefore required regularly for good sharpness.

A high-quality, scratch-resistant UV blocking filter (see pages 8 and 9) is recommended since a scratched front lens element can make the lens, which is expensive in comparison with the filter, impossible to use. Apart from clear far view with less bluish haze und improved sharpness, it has no visible effect on the image and can therefore remain on the lens at all times.

The coating of all Rodenstock filters is more scratch-resistant than the hard glass. The filters of the HR Digital line with "super MC" have a further coating on top of the MC coating which is even harder and has an additional beneficial property: It is repellent to water and oil. This means that water does not wet the glass, but rather forms pearl-like drops as on the lotus blossom famous for this effect. The drops of water roll off instead of sticking to the glass and causing streaks. Oil and fat admittedly do not form drops which roll off, but they do adhere less so that they can be wiped off more easily and without the risk of damage.



Water forms spheres and rolls off



Water adheres to the filter glass

The UV blocking filter HR Digital UV "super MC" is in particular the ideal colorless lens protection filter. It protects the front lens element against dirt and scratches and against soft-focusing wetting.

Three Filter Series for Your Choice

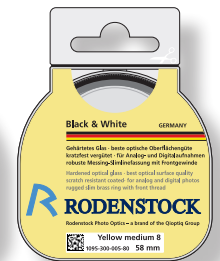
Uncompromising premium quality



Optimum value for your money



Perfect for slides and black & white



UV Blocking Filter



HR Digital UV super MC Digital pro UV MC

O Violet light is scattered around ten times more by the air molecules than red radiation; UV radiation even more. Dust particles (smoke) or fine water droplets (mist) in the air amplify the effect. Far views show a bluish tinge, reduced contrast and a lack of sharpness because normal lenses are not corrected for UV radiation and because sensors or films react almost in the same way to UV as to blue-violet light.

Rodenstock UV blocking filters block the UV radiation with a steep flank exactly at the border to visible light, that is extremely efficiently and have perfect color neutrality. Many other UV blocking filters still transmit a lot of UV radiation, e.g. up to 320 nm. Others admittedly block the UV radiation almost as efficiently as Rodenstock UV blocking filters, but also attenuate blue violet up to almost 440 nm and so cause a slight yellowish tinge.

Due to the perfect color neutrality, Rodenstock UV blocking filters are also ideal protective filters which can stay on the lens at all times. They protect the front lens element against dirt, can be cleaned more easily than the lens element and protect the front lens element against scratches and blows.

The UV blocking filters of the HR Digital line are furthermore characterized by a water-repellent coating at which water rolls off and oil, fingerprints and other contamination adhere less and which is even more scratch-resistant than the coating.

Rodenstock UV blocking filters belong in every bag of photographic accessories. They are also free of vignetting with wide-angle shots because they have a thin, slimline frame. They have a front thread and so the protective cap or a lens hood or a further filter can be screwed on as required.

No exposure correction is necessary due to the high transmission.

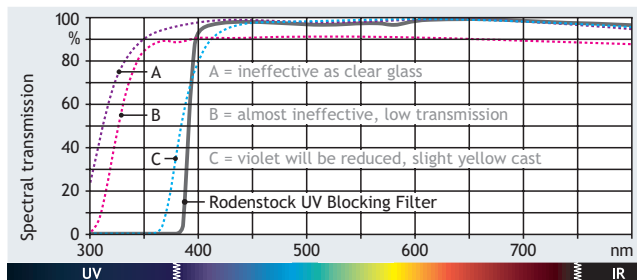


Photo without filter:
Distant view has low contrast
and a bluish cast



Photo with UV blocking filter:
Distant view has more contrast
and is color neutral

HR Digital UV super MC

Best optical glass · perfect optical surface quality · multi-coated · high transmission from 400 nm on · total blocking of UV · extremely scratch resistant · liquid and dirt-repellent coated · rugged slim brass ring with front thread · wide-angle compatible

Sizes: 37/39/40,5/43/46/49/52/55/58/62/67/72/82/86/95 mm

Digital pro UV MC

Best optical glass · perfect optical surface quality · multi-coated · high transmission from 400 nm on · total blocking of UV · scratch resistant · rugged slim ring with front thread · WA compatible

Sizes: 34/37/40,5/43/46/49/52/55/58/62/67/72/82 mm

Circular Polarizing Filter

HR Digital CPL super MC
Digital pro CPL MC



When light is incident on a surface, it is partly reflected. With a slanting incidence of light, it is also more or less polarized provided that the surface is not electrically conductive like glass, plastic or lacquer or is hardly electrically conductive like water (whose conductivity is low relative to that of metals). The polarization increases with the angle of incidence, reaches a maximum at around 55° and then drops again.

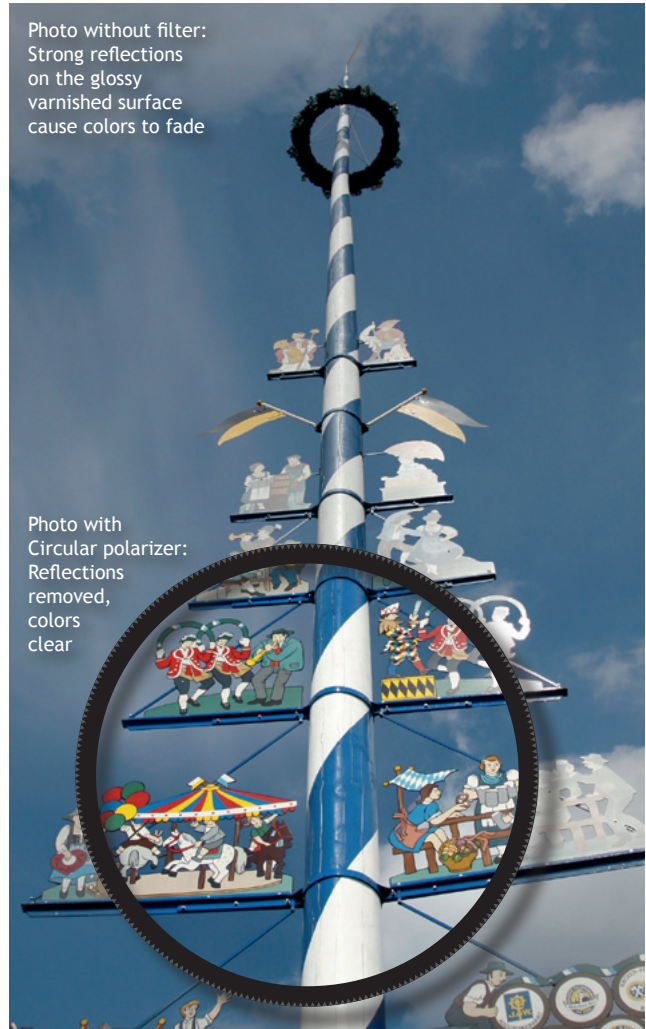
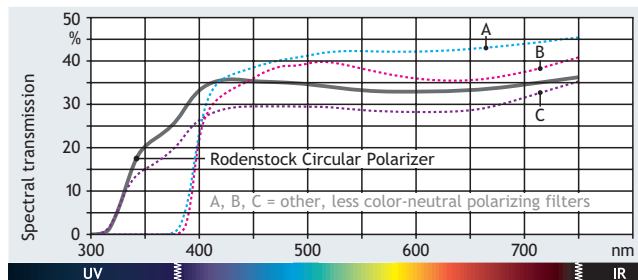
Electrically conductive surfaces, e.g. blank metal, do not cause polarization. If the metal is lacquered or has an insulating coating, polarization arises at the insulating layer, e.g. aluminum which forms a non-conductive aluminum oxide layer at air.

A polarization filter only transmits light oscillating at a specific direction without hindrance; in the case of light oscillating obliquely thereto, only the portion oscillating in this direction; it is therefore attenuated. Light oscillating transversely to the direction of polarization is blocked. Consequently, reflections can be reduced or even fully eliminated at an ideal angle of incidence of around 55°. Conversely, reflections can also be amplified up to twice the brightness, e.g. for more intensive sun reflections on water, using the filter if it is rotated by 90° from the maximum attenuation.

The blue light of the sky reflected e.g. from red roofs, green grass and foliage is polarized. Landscape shots taken with a polarization filter therefore allow the blue tinge to be reduced and thus produce a better color saturation for purer colors.

Blue light from the sky can be intensified using a polarization filter rotated into a suitable position (to emphasize white clouds) because it is highly polarized above all in a direction of view of around 90° to the sun.

The Circular Polarization Filter requires 1.5 f/stops as a correction.



HR Digital CPL super MC

Best optical glass · perfect optical surface quality · multi-coated · high polarizing efficiency · color neutral transmission · extremely scratch resistant · liquid and dirt-repellent coated · rugged slim brass ring with front thread · wide-angle compatible

Sizes: 49/52/55/58/62/67/72/82/86/95 mm

Digital pro CPL MC

Best optical glass · perfect optical surface quality · multi-coated · high polarizing efficiency · color neutral transmission · very scratch resistant · rugged slim ring with front thread · WA compatible

Sizes: 49/52/55/58/62/67/72/82 mm

Neutral Density Filters

2x, 4x, 8x



HR Digital ND 0,3/2x, 0,6/4x, 0,9/8x MC



Every photographer normally wants bright light. However, when fast motion is to be illustrated by blurring, it is sometimes too bright for the longer exposure time required for the "smear effect". The exposure time could admittedly often be extended by stopping down more, but then increasing diffraction would reduce the sharpness (see page 15 below).

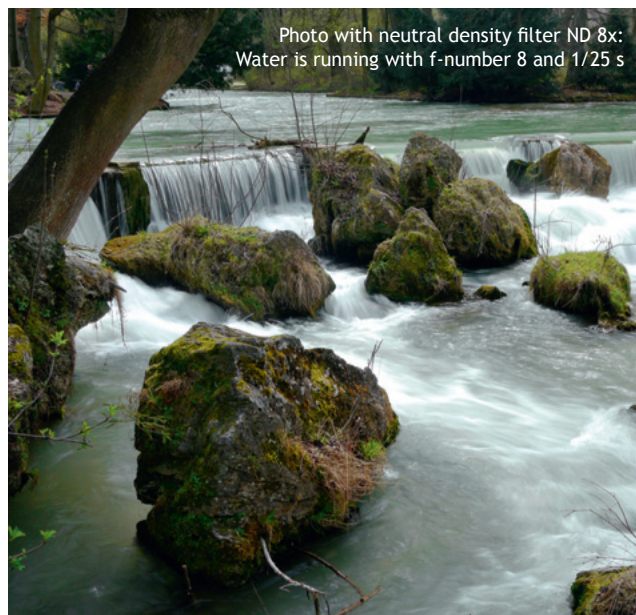
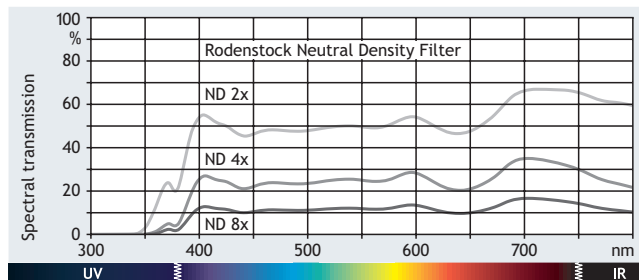
Sometimes, it can be too bright to stop up for low depth of field, e.g. for a sharp person against a blurred background.

These problems can be solved easily using the HR Digital neutral density filters with color-neutral light attenuation available from Rodenstock. They allow an exposure extension by a factor of 2, 4 or 8 for impressive smear effects on a further opening of the aperture by one, two or three stops for a much reduced depth of field. The number 0.3, 0.6, and 0.9 on the filter frame indicates the "logarithmic density" of the respective filter.

The ND 4x filter would e.g. allow an exposure time of 1/250 s instead of 1/1000 s, which allows fill-flash, for a portrait of low depth of field at f/stop 2.8. Or a longer exposure time of 1/60 s could be set at f/stop 5.6 instead of 1/250 s, which is absolutely necessary for the panning smear effect in car racing.

If you only buy one ND filter, you should buy the most versatile ND 4x filter. It will then become clear in practice whether an ND 2x or an ND 8x may be necessary (for even higher values, see Digital Vario ND on pages 14 and 15).

Rodenstock gray filters ensure perfect sharpness and, thanks to spectrally balanced damping, neutral color reproduction.



HR Digital ND 0,3/2x, 0,6/4x, 0,9/8x MC

Best optical glass · perfect optical surface quality · multi-coated · color neutral reduction of light intensity · very scratch resistant · rugged slim brass ring with front thread · wide-angle compatible

Sizes: 49/52/55/58/62/67/72/82 mm

Variable Neutral Density Filter



Digital Vario ND MC

When gray filters are used such as described on pages 12 and 13, different density stages can be useful. If you need more than the ND stages 2x, 4x and 8x or want finer graduations, you can select the variable neutral density filter Rodenstock Digital Vario ND. It consists of two polarization filters whose second filter is a circular polarization filter so that the auto-focus and exposure measurement is not impaired. An attenuation by 1.5 to 5 stops (corresponds to the exposure time extension of 2.8x to 32x) can be set continuously over a wide density range by rotating the front polarization filter. A factor of less than 2.8 is not possible as a matter of principle due to the polarization filter transmission which is around 35%.

Variable neutral density filters can be set via 5 stops attenuation (extension factor 32x) up to around 9 stops (more than 400x). However, due to the inherent principle two negative effects then occur (not only with Rodenstock Vario ND filters):

The color neutrality is gradually lost above a factor of 32x. The reason is that the polarization of the polarization films is much lower for blue-violet light. Blue-violet light is therefore no longer attenuated sufficiently in an approximately crossed position of the polarization filters (i.e. not of equal strength as with other colors) so that a blue-violet color tinge results. Furthermore, with very wide-angle lenses, disturbing cruciform shading occurs close to the maximum position (above around 7 stops or 128x).

Because these very high settings cannot be recommended for the named reasons, the setting scale of the Rodenstock Digital Vario ND only indicates the sensible attenuation range +1.5 to +5 without cruciform shading and without a blue-violet color tinge.

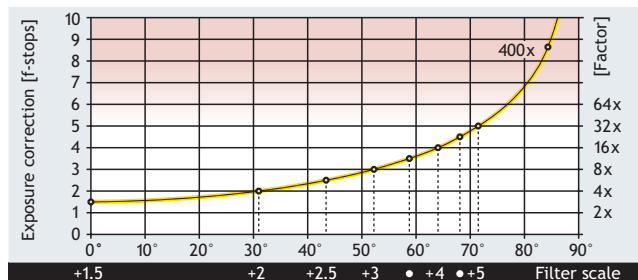


Photo without filter: Despite f-number 16 only 1/125 s



Photo with filter: 1/20 s is possible with f-number 5.6



Blur due to diffraction at f-number 16 without filter



With filter f-number 5.6 prevents diffraction

Digital Vario ND MC

Best optical glass · perfect optical surface quality · multi-coated · variable color neutral reduction of light intensity · very scratch resistant · rugged slim ring with front thread · wide-angle compatible

Sizes: 49/52/55/58/62/67/72/82 mm

UV/IR Blocking Filter



HR Digital UV/IR

Digital camera sensors are also somewhat sensitive to ultra-violet radiation (UV) and to a high degree to infrared radiation (IR). A corresponding blocking filter in front of the sensor is therefore required for correct-color digital shots. It also serves as a protection for the microlens elements and the RGB Bayer filter (chessboard-like array of tiny red, green and blue filters which allocates one of the three RGB colors to each pixel).

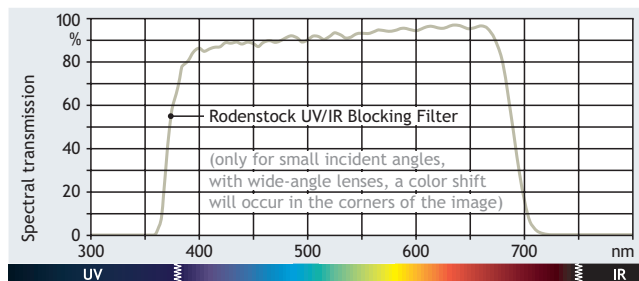
Its blocking effect is unfortunately not sufficient for some digital cameras and specifically not for older digital cameras. This means that with a high infrared portion in the light chlorophyll can appear too bright because it is highly reflective for IR radiation.

Furthermore, false colors then arise because not only the red color, but also the green and blue colors of the RGB Bayer filter are transmissible for infrared. A reddish tinge, such as is initially expected, therefore does not always have to occur. Whether only a brightening occurs or also false colors and the strength of the two features depend on the efficiency of the camera's internal IR blocking filter and on the IR transmissibility of the individual RGB filters. Furthermore, if the IR transmissibility is too high, blur can also occur because the lens is not corrected for IR.

Using the Rodenstock UV/IR blocking filters means that you are always on the safe side both for a far view with a high portion of UV radiation (see pages 8 and 9 for more details) and in intensive sunshine with a high degree of IR reflection by chlorophyll. It blocks UV and IR radiation with a steep flank and ensures true colors.

Cameras with a sensor modified for infrared shots or astronomical H-alpha shots always require an external UV/IR blocking filter for use for normal true-color shots.

The UV/IR blocking filter does not require any exposure correction.



Without filter: The green of the plants is too bright und discolored



With UV/IR blocking filter:
Natural colors of green plants

Water absorbs infrared radiation. Therefore, the reflections of the trees on the water keep green even without a UV/IR blocking filter.

HR Digital UV/IR

Best optical glass · perfect optical surface quality · color neutral · steep-edged interference filter · very scratch resistant · rugged slim brass ring with front thread · wide-angle compatible

Sizes: 37/39/40,5/43/46/49/52/55/58/62/67/72/82 mm

Skylight Filter for Color Slide Film



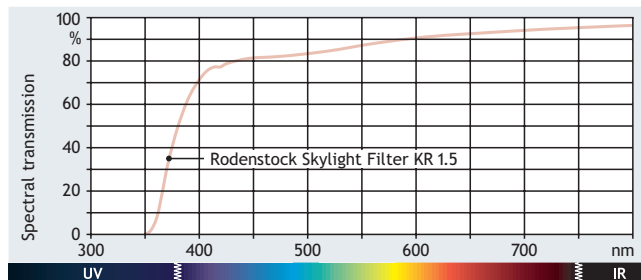
Skylight MC

Under a blue sky, motifs in the shade always have a slight blue tinge. Digital cameras can eliminate it by white balance, but color slide films cannot. A skylight filter is therefore not needed in digital photography, but is necessary for analog photography on reversible color film to ensure the correct color balance of the motifs in the shade.

The light color of the sun can be measured as the "color temperature" from 5500 K to 5600 K (K = Kelvin). Daylight color reversal films are adjusted for this value and therefore only reproduce the colors of all objects true to nature at exactly this light color. If, however, shooting takes place on a sunny day under a blue sky in the shade, the motif only receives indirect light which emanates predominantly from the blue sky and therefore lights the motifs taken in the shade with "cool" blue tinge.

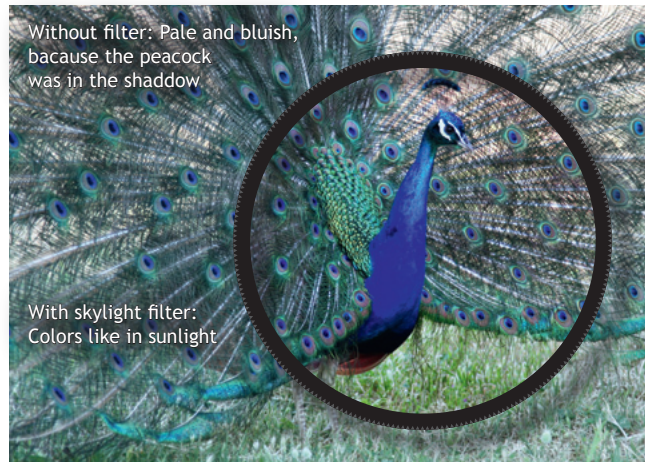
A filter whose light transmissibility reduces continuously toward short wavelengths, as in the diagram below, is necessary for color-neutral color slides because the sky light in the shade has too high a proportion of short wavelengths and too small a proportion of long wavelengths. The blue tinge disappears, the photos become as color neutral as with automatic white balance.

When using the Skylight filter, you should note that it always influences the whole shot (just like the white balance of a digital camera). If the photo has equally large areas in the sunshine as in the shade, the Skylight filter will admittedly eliminate the blue tinge in the shade, but will necessarily also give the areas of the image in the sunshine a slightly reddish hue. You should therefore select your image detail where possible such that the motif is either predominantly lit by sunshine (then no filter) or is predominantly in the shade (then use the filter).



Without filter: The north front of the castle looks pale

With skylight filter: The warm original colors have been restored



Without filter: Pale and bluish, because the peacock was in the shadow

With skylight filter: Colors like in sunlight

Skylight MC

Best optical glass · perfect optical surface quality · multi-coated · brings warm colors into shadow areas · very scratch resistant · rugged slim brass ring with front thread · wide-angle compatible

Sizes: 37/39/40,5/43/46/49/52/55/58/62/67/72/82/86/95 mm

Color Filters Yellow, Orange and Red for Black & White



Black & White



Black and white landscape and architectural shots with a blue sky often give the sky a pale effect and thus show clouds with too little contrast, irrespective whether taken digitally or on film. Yellow filters suppress violet and weaken blue. In a black & white image, the sky becomes darker and the bright clouds have a more plastic definition. In far shots, the bluish haze is weakened, the background becomes clearer. With portraits, yellow filters help reduce freckles. The exposure correction of the medium yellow filter amounts to around 1 stop; that of the dark yellow filter to around 1.5 stops.



The orange filter reduces blue more and already reduces green a little. The sky can become dramatically dark, the bluish shadows become noticeably more powerful (particularly with snow landscapes) under a blue sky. In portraits, skin impurities are suppressed more, but red lips are simultaneously also lightened a little (put some lipstick on). The exposure correction amounts to around 2 stops.

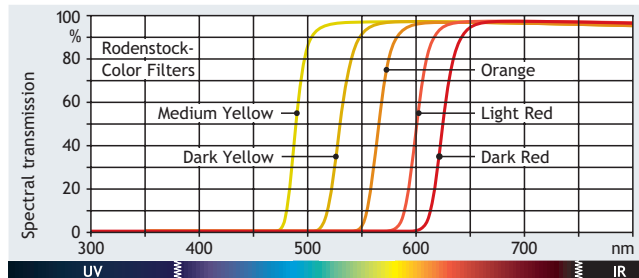


Red filters darken blue-green as well as green a lot, give a normal cloudy sky almost a thunderstorm atmosphere and reproduce green vegetation in much darker form. Severe architectural shots can gain a lot; red roofs and blossoms are lightened and are more distinct against green leaves. The bright red filter requires an exposure correction of around 3 stops; the dark red filter around 4 stops.

Black & White (Yellow, Orange and Red)

Best optical glass · perfect optical surface quality · single-coated · for analog and digital black & white photos · very scratch resistant · rugged slim brass ring with front thread · wide-angle compatible

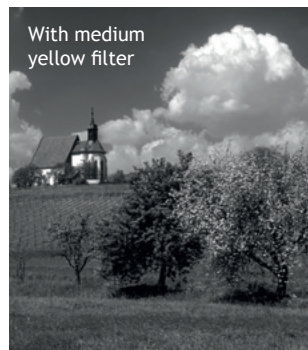
Sizes: 37/39/40,5/43/46/49/52/55/58/62/67/72/82/86/95 mm



Original Colors



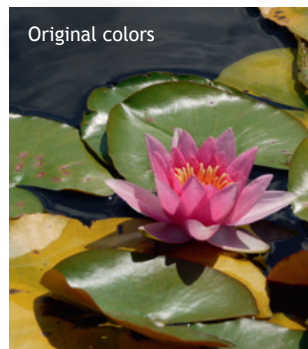
Without filter



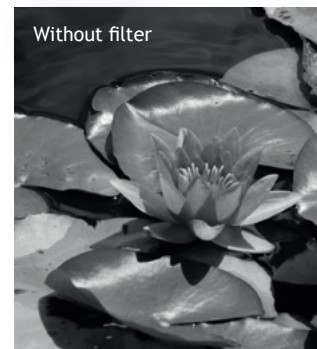
With medium yellow filter



With orange filter



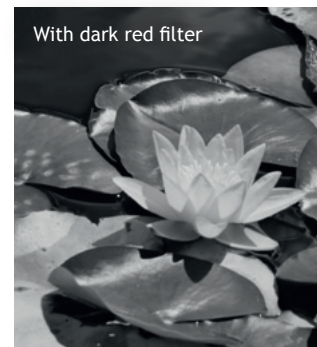
Original colors



Without filter



With bright red filter



With dark red filter

Rodenstock Filters for digital and analog Photography

Description on page ...	Multi/Single coating	Water and dirt repellent	Blackend margin of glass	Brass filter frame	Slimline filter frame	Front thread for lens cap	34 x 0.5	37 x 0.75	39 x 0.5	40.5 x 0.5	43 x 0.75	46 x 0.75	49 x 0.75	52 x 0.75	55 x 0.75	58 x 0.75	60 x 0.75	62 x 0.75	67 x 0.75	72 x 0.75	77 x 0.75	82 x 0.75	86 x 1.0	95 x 1.0	
UV Blocking Filter																									
HR Digital super MC UV for clear distant views and as a lens protector	10	M	W	B	B	S	F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Digital pro MC UV for clear distant views and as a lens protector	10	M		B		S	F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Circular Polarizing Filter																									
HR Digital super MC CP for clear colors and against reflections	12	M	W	B	B	S	F							●	●	●	●		●	●	●	●	●	●	●
Digital pro MC CP for clear colors and against reflections	12	M		B		S	F							●	●	●	●		●	●	●	●	●	●	●
Neutral Density Filter																									
HR Digital MC ND 0,3/2x for motion blur or narrower depth of field	14	M		B	B	S	F							●	●	●	●		●	●	●	●	●	●	●
HR Digital MC ND 0,6/4x for motion blur or narrower depth of field	14	M		B	B	S	F							●	●	●	●		●	●	●	●	●	●	●
HR Digital MC ND 0,9/8x for motion blur or narrower depth of field	14	M		B	B	S	F							●	●	●	●		●	●	●	●	●	●	●
Variable Neutral Density Filter																									
Digital Vario ND 2 - ND 400 MC with a large and stepless range of density	16	M		B		S	F							●	●	●	●		●	●	●	●	●	●	●
UV and IR Blocking Filter																									
HR Digital UV/IR as protection against UV and IR radiation	18			B	B	S	F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Skylight Filter for Color Slides																									
Skylight Filter against bluish cast in shadow areas	19	M		B	B	S	F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Color Filters for Black & White																									
Color Filter Medium Yellow for a darker sky with dramatic clouds	20	S		B	B	S	F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Color Filter Dark Yellow with a stronger effect than medium yellow	20	S		B	B	S	F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Color Filter Orange with even stronger effect than dark yellow	20	S		B	B	S	F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Color Filter Bright Red for a very dark sky an brighter red	20	S		B	B	S	F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Color Filter Dark Red for an extremely dark sky and even brighter red	20	S		B	B	S	F	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

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