

HOYA

F I L T E R S

**For the Moments to
Remember**







「Victory Monument」 Photographed by Jackchalat Chaiykhom (U.S.A.)
International Filter Photo Contest 2012-2013 Grand Prize

THE PRODUCTION PROCESS OF HOYA FILTERS

Each Hoya filter is the result of research, know-how and complete precision facilities backed by full quality control.

Before production starts, controls are first programmed into a computer. Then the finest materials are carefully mixed by an automatic V-blender for absolute uniformity. After being melted with highly sophisticated equipment, this material is then precision molded with automatic direct pressing equipment. The pressed blanks are next then slowly and continuously cooled to prevent any strain, and are then polished by high-speed, double-surface polishing machines that assure precise surface quality and perfect flatness.

Next is the coating process which improves the filter light transmission ability. The transmission characteristics are checked by Spectro-Photometer, after which an ultra-sonic cleaner removes all foreign matter from the surfaces. Only after passing all of Hoya's quality tests are the filters assembled, finished and made ready for shipment to customers throughout the world.



HOYA SEES AND RESPONDS TO THE NEEDS OF TODAY

HOYA Corporation has diversified its operations by capitalizing on the potential of optoelectronic technologies since its establishment in 1941 as Japan's first specialty manufacturer of optical glass.

Today, Hoya is active in four fields of business:

Information Technology business makes mask blanks and photomasks for semiconductor devices and liquid crystal panels, optical lenses, and glass memory disks for hard disk drives. The Eye Care provides eyeglasses and operates contact lens retail shops, as well as makes intraocular lenses for cataract surgery. The Life Care Business provides endoscopic systems. The Imaging System produces SLR/compact digital cameras and interchangeable lenses as well as digital camera lens module and microlens.

With HOYA's approval, Kenko Tokina Co., Ltd. delivers HOYA brand filters around the world.

O U T L I N E

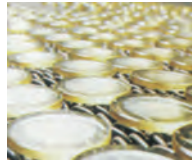
INFORMATION TECHNOLOGY

EYE CARE

MEDICAL

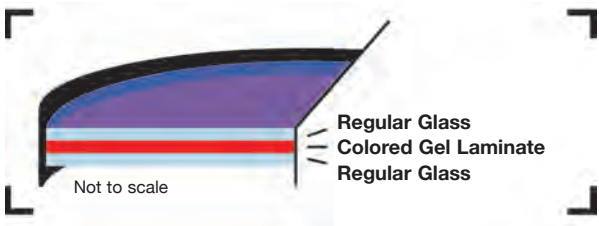
IMAGING SYSTEM

A L L F I L T E R S A R E



How another Large Manufacturer makes Filters

Imagine a sandwich made with a thin gel or even colored glue between two pieces of regular glass, similar to the glass used in windowpanes. This is how some other brands of optical filters are made. These types of filters are cheap to produce, but inferior for several reasons:



1. Over time, the expansion and contraction of the different materials can lead to delamination, which is a separation of the different materials. This will show up as bubbling, peeling, or discoloration, rendering the filter useless.
2. The color of the gel can shift or fade over a relatively short period of time and will not yield the same color rendition.
3. If all six surfaces, three layers, two surfaces each, are not perfectly flat and perfectly parallel, the filter causes a “lens effect” which degrades the optical performance, or in extreme cases, shift or limit the focus of the lens it is used with.

How Hoya Makes Filter Glass



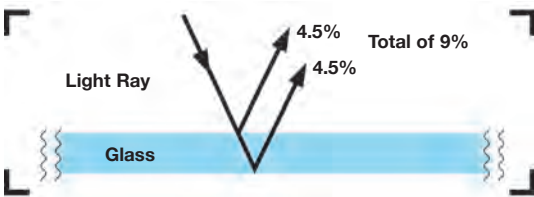
To make its filters, Hoya adds different raw elements, like gold, and chemicals compounds to its optical glass silicates while mixing in a molten state. To insure consistency in glass manufacturing, Hoya uses a furnace called an Automatic V blender to mix the different materials continuously at a highly controlled rate. This ensures that Hoya filter glass is uniformly colored all the way through. There is never any risk of uneven coloration, shifting or fading of the color, or delamination. The two surfaces are ground and polished for perfect flatness.

NOT CREATED EQUAL!



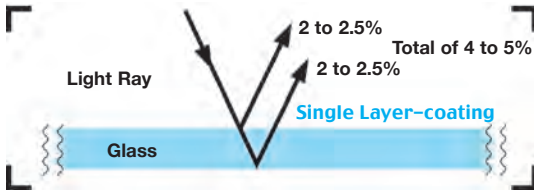
Hoya Coating and Multi-Coating, the Quality Difference.

Hoya manufactures a full line of filters in both standard and Hoya multi-coated. The difference between Hoya's standard line and that of other manufacturer is that Hoya standard filters have a layer of anti-reflective coating bonded to each surface of the glass. Many other manufacturer's standard filters are bare glass, and bare glass can reflect as much as 10% of the light hitting it. This greatly increases the risks of flare and ghosting and reflections.

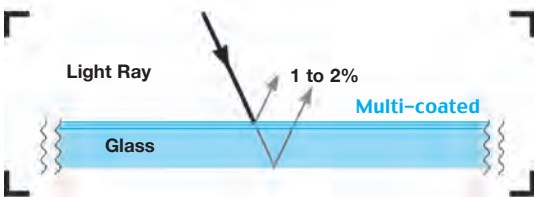


Hoya's single layer coating decreases light reflection off the surface from approx. 10% down to 4-5%.

Multi-Coating, Clearly Different



To provide photographers with a higher quality professionals require, Hoya created the Multi-coated line of filters. These filters have a 3 layer coating system that further reduces light reflections off the surfaces of the glass, the average is only 1-2%. This means that 98-99% of the light striking the filter is going through it, into the camera lens and onto the film or sensor. These layers of anti-reflective coating are bonded to the surface of the glass in a furnace at a temperature of up to 800 degrees F, so there is never any chance of the coatings coming off through normal use.



You should beware!

Some other manufacturers claim to have "coated" filters. But this coating is often only applied to the front side of the glass, not both sides like Hoya filters. Also, the coating on some filters is "painted" on or applied as a cold spray that wears off or can even flake off easily.

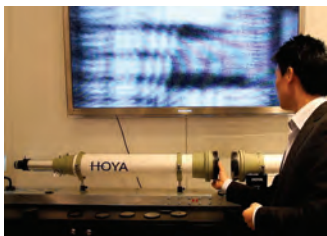
T H E D I F F E R E N C E



Filter Quality Comparison

The apparatus on the counter in the image below is a simple collimator used for testing the optical clarity of filters and other optics. On one side is a light source shining into an "eyepiece" that contains a test chart. The image of the test chart is projected through one telescope into the other. The other telescope has a video camera attached to its eyepiece so the test pattern can be displayed on the LCD TV mounted above.

There are so many circular polarizing filters in the world, most are made in India or China regardless of what name is on them. They all look fine and clear if you look through them but once tested by the collimator you can find that these filters degrade the image quality so that the test pattern cannot even be seen. (See the image left below) It would be impossible to get a sharp picture when photographing with these filters. The test pattern shown right below is shot with Hoya circular polarizing filter and it has almost no optical effect on it. This is how a filter should perform in this test.



Other brand circular polarizing filter



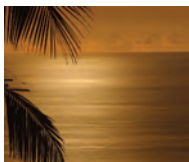
HOYA circular polarizing filter

We've Been Framed!

Hoya believes the filter frame is an extremely important part of the filter as well. Hoya created precision machined aluminum frames to hold their high quality glass. They prefer aluminum to other materials because it is strong enough to hold up to years of use. Some say that brass is the best material to use. However, Hoya doesn't hold that view and here is why; brass is a far more rigid material than either aluminum, or other materials that are being used in today's lens barrels. This means that, should the front of the lens get hit, the rigid brass filter ring will transfer almost all the force of the shock to the lens barrels and mechanics within the lens. An aluminum filter frame will absorb some of the shock by bending, and at a certain point the glass will chip or break, which is what the filter is supposed to do, protect the lens! Replacing a filter is always preferable to getting a lens repaired.



I S C L E A R !



The Value in a Hoya Multi-coated filter

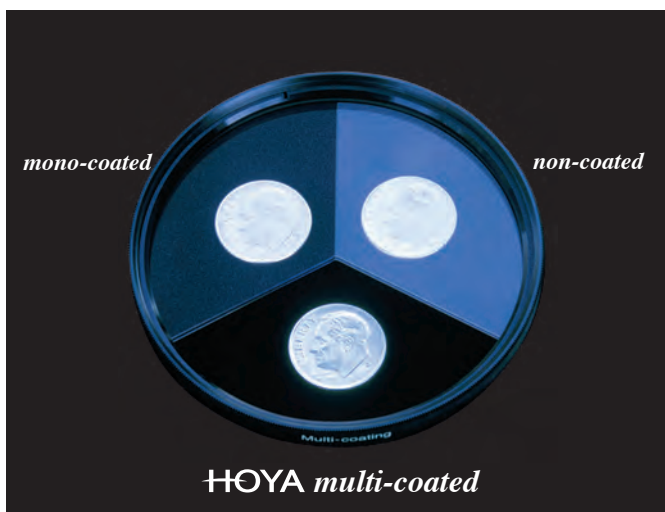
Wide aperture professional lenses are very expensive, and all photographers want to get the most speed, optical performance, and dollar performance from their investment.

There is a saying: "A \$1,200 lens with a \$20 filter will perform like a \$20 filter. If a customer pays \$1,200 for a 80-200 f/2.8 lens and puts a cheap bare glass filter in front of it that filter is going to reflect 10% of the light that strikes it. That is slowing the lens down 10%, lowering the value of the lens 10\$ or \$120. Does the cheap filter still look like it's a good deal? The cost savings of the less expensive filter do not off-set the light loss.

Also, this does not address the possible loss of sharpness or focus shift, which can have a detrimental impact on picture quality. For these reasons, Hoya multi-coated filters present the best value in filters available today.

Testing, 1, 2, 3...

Take a bare glass filter, hold it so that light reflection off the surface can be seen. Then take a long very thin object like a pin or the tip of a pen and hold it over the filter so that its reflection can be seen. There will actually be two reflections of the pin on the surface, one a little more pronounced than the other. The more pronounced reflection is from the front surface and the lighter one is from light reflecting off the rear surface. Now try it with a HOYA Multi-coated filter and see how much more dim the reflection is, a dimmer reflection means less light is reflected off the surface of the glass.



HOYA OFFERS A WIDE VARIETY

HOYA offers a wide variety of superior quality filters for use in all imaging applications such as 35mm SLR cameras, Medium Format, Large Format, Video, Movie and Digital. It is important to select the best filters for your needs, as choosing inferior brands can deteriorate the performance of your high quality lenses. HOYA filters guarantee you the highest standards so you can create the best images.

In order for you to fully understand the wide range which HOYA offers, the four main categories, into which our filters are grouped, are explained below:

GENERAL FILTERS

This group includes everyday filters which can be left on your lenses, such as Skylight 1B, UV and Polarising. These are the first filters that every photographer should ensure they own. Skylight and UV filters should be constantly fitted to a lens to give improved clarity and color balance as well as offering protection to your lens. Polarising filters have several uses such as eliminating unwanted reflections, increasing color saturation and enhancing contrast. As to whether you should use Circular Polarising or Linear Polarising filters with your camera, we recommend that you refer to the detailed explanation later in this catalogue.

CREATIVE FILTERS

This is a new classification, exclusive to HOYA. Although similar to general filters, they produce a subtle, but realistic result which may be used to artistic effect. They are also suitable for use as everyday protection filters and may be combined with other types such as Circular- PL and UV for enhanced effect. In this case, we recommend the use of HD2, EVO or NXT series filters which have thin rings and multicoating to avoid vignetting and ghosting.

COLORED FILTERS

As their names suggests, these filters use HOYA colored glass. They are used for color correction of different light sources when using color film, or for controlling contrast with Black & White film. Color correction filters are important as color films do not have the flexibility of the human eye to automatically adjust to different situations. Black & White films register colors as shades of grey and the rendition of each color in a scene is important, so filters can be used to control this. The color of the glass used in all these filters is carefully controlled and to reduce the possibility of color shift over a period of time, such high quality filters are coated or multicoated on both sides. This maintains the desired effect and gives a long service life.

SPECIAL EFFECT FILTERS

As you saw in the previous pages of this catalogue, HOYA makes it possible to add many different special effects to your pictures, such as star-bursts, close-ups, softening and multi-images. It is simple to achieve outstanding creative or unusual results and take special photographs for memorable occasions such as weddings, birthdays and holidays.

OF SUPERIOR QUALITY FILTERS

Why Coated?

There are three main reasons why filters should be coated. First, coating enhances light transmission, second, it protects the surface of the filter and third, it removes ghosting and flare, particularly between the rear of a filter and the surface of a lens. In general, light transmission increases as more layers of coating are applied.

Within these four groups, we offer a choice of grades with different coatings as follows:

STANDARD

These filters offer both amateur and professional photographers HOYA's famous quality at reasonable prices. They have coatings applied to both surfaces to suppress reflection and increase light transmission. There are a few exceptions in the special effects range which, due to the special materials used in construction, do not have coatings applied.

HMC (HOYA MULTI COATED)

These popular filters are renowned for their ability to minimise reflection at the filter surfaces which reduces flare and ghosting. The result is an average light transmission of over 97%, giving sharp contrast and well balanced color. HOYA HMC filters are recommended for enhancing the performance of today's multicoated lenses.

PRO1 DIGITAL FILTERS

Newly formulated multi-coating for digital camera CCD or CMOS sensor. These image capture devices are highly susceptible to reflections - this stray light can ruin your photographs! Don't risk your valuable photos by using bare-glass filters.

HD FILTERS

Newly developed industry leading 8-layer multi-coating yields an average light transmission rate of 99.35% between 400 and 700nm (visible spectrum). These coatings greatly reduce reflections off the surface of the glass allowing you to capture more light in your photos. As with all HOYA multi-coatings, HD HMC is applied in a furnace at high heat, bonding the coating to the surface of the glass. This process is called "hard coating" and it is far more durable than other coating techniques. The chemistry of the top layer is formulated not just to be more durable but to be resistant to oil stains. This means that finger prints and other oils are much easier to remove.

PROND FILTERS

PRO ND coating is the coating which had reduction of reflectance, and a neutral damping characteristic to the broadband. PRO ND coating is given to both sides of the polished glass, and the filter is assembled with structure with few optical leaks.

HD FILTERS

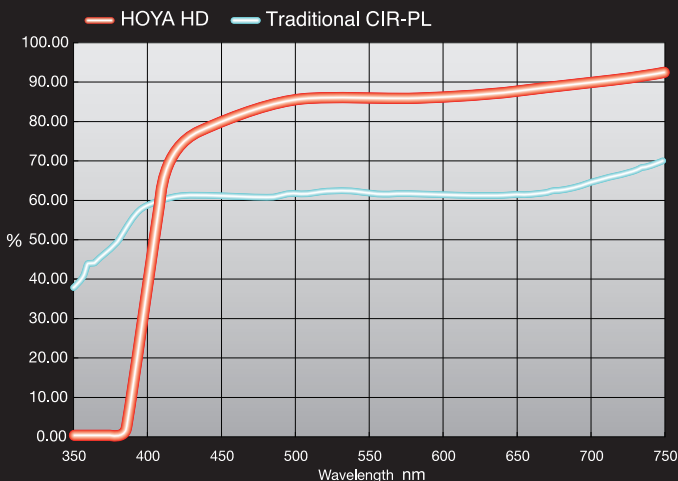
Premium Performance in Lens Protection and Image Enhancement

HARDENED GLASS (UV / PROTECTOR)

Hardened optical glass that has 4 times the breaking strength in ANSI standardized testing (ANSI Z80.3 : 2001) where a steel balls of varying size and weight were dropped from a height of 50 inches onto the glass.

HIGH TRANSPARENCY POLARIZING FILM (CIR-PL)

The polarizing film is the same as that used in the latest high definition LCD TV screens. It has 25% higher light transmission than standard polarizing film used in current photographic filters.



HARDENED 8 LAYER WATERPROOF MULTI-COATING THAT IS SCRATCH & STAIN RESISTANT

Newly developed industry leading 8-layer multi-coating yields an average light transmission rate of 99.35% between 400 and 700nm (visible spectrum). These coatings greatly reduce reflections off the surface of the glass allowing you to capture more light in your photos.

As with all HOYA multi-coatings, HD HMC is applied in a furnace at high heat, bonding the coating to the surface of the glass. This process is called "hard coating" and it is far more durable than other coating techniques. The chemistry of the top layer is formulated not just to be more durable but to be resistant to oil stains. This means that finger prints and other oils are much easier to remove.

HD FILTER

UV



Best Quality Filter in History

HD GLASS

- High Density Sharp Cut UV Glass
- Chemically Enhanced Optical Glass is 4x Stronger

HD COATING

- 8-layer Anti-Reflective Multi-Coating
- Water & Oil Repellent, Scratch & Stain Resistant

HD FRAME

- Wide-Angle Lens Compatible Ultra Thin Frame
- Glass Mounted with High Pressure Press Technology

A multi-purpose fine-weather filter

Absorbs the ultraviolet rays which often make outdoor photographs hazy and indistinct. A multi-purpose, fine-weather filter for color as well as black and white films. Also serves as a permanent lens protector.

Available sizes (mm):

37	40.5	43	46	49	52	55	58	62	67	72	77	82
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HD FILTER

CIR-PL



Best Filter Performance in History

HD POLARIZING FILM

- High Transparency & High Durability UV Absorbing Film
- 25% Greater Light Transmission than Standard Polarizing Film

HD COATING

- 8-layer Anti-Reflective Multi-Coating
- Water & Oil Repellent, Scratch & Stain Resistant

HD FRAME

- Wide-Angle Lens Compatible Ultra Thin Frame
- Glass Mounted with High Pressure Press Technology

Color and contrast enhancement

Light rays which are reflected by any surface can become polarised so polarising filters are used to select which light rays enter your camera lens. CIR-PL filters allow you to remove unwanted reflections from non-metallic surfaces such as water, glass etc. They also enable colors to become more saturated and appear clearer with better contrast. This effect is often used to increase the contrast and saturation in blue skies and white clouds. HOYA's polarising filters will not affect the overall color balance of a shot.

Available sizes (mm):

37	40.5	43	46	49	52	55	58	62	67	72	77	82
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HD FILTER PROTECTOR



Best Lens Protection in History

HD GLASS

- Ultra Clear High Transparency Optical Glass
- Chemically Enhanced Optical Glass is 4x Stronger

HD COATING

- 8-layer Anti-Reflective Multi-Coating
- Water & Oil Repellent, Scratch & Stain Resistant

HD FRAME

- Wide-Angle Lens Compatible Ultra Thin Frame
- Glass Mounted with High Pressure Press Technology

Protect your valued lenses

This is the ultimate in clear filters. It will not affect the color balance or performance of your lenses in the slightest. However, constant use will protect your valued lenses from expensive front element damage which could be caused by dirt, knocks or scratches. A cracked filter costs nothing in comparison to a cracked lens.

Available sizes (mm):

37	40.5	43	46	49	52	55	58	62	67	72	77	82
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PRO1 Digital *Filter Series*

Designed exclusively for
digital cameras



Digital Multi-Coated

Digital multi-coated filters greatly reduce the appearance of lens flare and ghosting caused by reflections.



Black Almite Frame

Filters feature a black matte aluminum satin finish almite frame which reduces reflections.



Black Rimmed Glass

These filters are equipped with black rimmed glass to reduce the chance of light reflecting off the edge.



Low Profile Frame

Ultra thin filter frames to help avoid vignetting on super wide angle lenses are also designed to hold a lens cap.



Knurling Edge Frame

These filters are equipped with a straight knurling edge for non-slip, easy attachment and removal.



UV Protected Case

Filter cases are UV protected to further lengthen the life of filters.

PRO1 **PROTECTOR**

Protect your valued lenses



This is the ultimate in clear filters. It will not affect the color balance or performance of your lenses in the slightest. However, constant use will protect your valued lenses from expensive front element damage which could be caused by dirt, knocks or scratches. A cracked filter costs nothing in comparison to a cracked lens.

Features:



Available sizes (mm):

37	40.5	43	46	49	52	55	58	62	67	72	77	82
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PRO1 CIRCULAR PL

Color and contrast enhancement



▲ With CIRCULAR PL Filter



▲ Without Filter

Light rays which are reflected by any surface can become polarised so polarising filters are used to select which light rays enter your camera lens. CIRCULAR PL filters allow you to remove unwanted reflections from non-metallic surfaces such as water, glass etc. They also enable colors to become more saturated and appear clearer with better contrast. This effect is often used to increase the contrast and saturation in blue skies and white clouds. HOYA's polarising filters will not affect the overall color balance of a shot.

Features:



Available sizes (mm):

37	40.5	43	46	49	52	55	58	62	67	72	77	82
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PRO1 UV (0)

A multi-purpose
fine-weather filter



▲ With UV(0) Filter



▲ Without Filter

Absorbs the ultraviolet rays which often make outdoor photographs hazy and indistinct. A multi-purpose, fine-weather filter for color as well as black and white films. Also serves as a permanent lens protector.

Features:



Available sizes (mm):

37	39	40.5	43	46	49	52	55	58	62	67	72	77	82
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PRO1 SOFTON-A

Clear focus and
soft gradation



▲ With SOFTON-A Filter



▲ Without Filter

Creates a picture with a clear focus and a soft gradation. This effect is especially evident on an object with a point light source. A filter randomly arranging minute lens shaped like drops of water on the surface of an acrylic board scatters the light and results in a soft focus.

Features:



Available sizes (mm):

52	55	58	62	67	72	77	82
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PRO1 STAR-4

Add a dramatic
four-cross flare



▲ With STAR-4 Filter



▲ Without Filter

The STAR-4 filter adds a dramatic four-cross flare to very bright areas, giving a soft-focus effect. Ideal for photographs of night scene illumination or other scenes with strong reflections.

Features:



Available sizes (mm):

52

55

58

62

67

72

77

82

PRO1 CLOSE-UP No.3

A world of new creativity



▲ With CLOSE-UP No.3 Filter



▲ Without Filter

The CLOSE-UP No.3 lens turns a normal lens into a macro by reducing the lens minimum focusing distance. Depth-of-field is shallow so use as small an aperture as possible. CLOSE-UP NO.3 offers a world of new creativity.

Features:



Available sizes (mm):

52	55	58	62	67	72	77	82
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HRT CIR-PL UV FILTER

The perfect filter to capture seasons



High-Rate Transparency Film

This filter uses a newly developed High-Rate Transparency film that passes more visible light through the filter while still filtering the same amount of polarized light. The HOYA HRT circular polarizer filter transmits as much as 25% more light through the polarizing film giving the photographer about 1/3 stop more light than a standard circular polarizer. This new polarizing film is also used in the latest HD LCD TVs.

UV Absorbing

The glass of the HOYA HRT filter also has UV absorbing properties making the HRT a combination UV/circular polarizing filter.

The most common use for a circular polarizer filter is to darken bright blue skies in outdoor photography, but they also can reduce or eliminate reflections from non-metallic surfaces such as glass and water. By rotating the outer ring of the filter the change of effect can be seen by looking through the filter or through the viewfinder if it is mounted on a camera.



HRT CIR-PL UV

The perfect filter to capture seasons



▲ With CIR-PL UV Filter



▲ Without Filter



Available sizes (mm):

37	49	52	55	58	62	67	72	77	82
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PROND

2.4.8.16.32.64

For wider apertures or longer exposures

PRO ND (Filter Factor)	Density	Adjust Exposure Stops (EV)	Transmission (%)
ND2	0.3	1.0	50.000
ND4	0.6	2.0	25.000
ND8	0.9	3.0	12.500
ND16	1.2	4.0	6.250
ND32	1.5	5.0	3.125
ND64	1.8	6.0	1.563
ND100	2.0	6 2/3	1.000
ND200	2.3	7 2/3	0.500
NDx400	2.6	8 2/3	0.250
ND500	2.7	9.0	0.200
ND1000	3.0	10.0	0.010



▲ With ND4 Filter



▲ Without Filter



▲ With ND8 Filter



▲ Without Filter

These PRO ND filters reduce the amount of light entering the lens so wider apertures can be selected, which is perfect for portraiture to reduce depth of field. Subject appears crisp and clear while the background becomes a soft blur. Also widely used for photographs of waterfalls and other nature scenes to emphasize movement.

Features: Anti-Reflection PRO ND Coating

NEUTRAL DENSITY FILTERS



◀ **No Filter**
1/30 second exp.



◀ **With ND16 Filter**
1/2 second exp.
4 stops light loss



◀ **With ND64 Filter**
2 second exp.
6 stops light loss

Available sizes (mm):

49	52	55	58	62	67	72	77	82
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PROND

100·200·500·1000**PROND 100 6 2/3-STOPS LIGHT LOSS****▲ With PRO ND Filter**

The HOYA PRO ND 100 is a dark neutral density filter with a filter factor of 100. This filter factor converts to a 6 2/3 stop light loss. This is a great filter slowing down the shutter speed to blur motion. Example: In daylight maybe the slowest shutter speed available with a filter is 1/60 sec' at F/22. By adding the PRO ND 200 a shutter speed of 2 full seconds would be possible.

PROND 200 7 2/3-STOPS LIGHT LOSS**▲ With PRO ND Filter**

The HOYA PRO ND 200 is a dark neutral density filter with a filter factor of 200. This filter factor converts to a 7 2/3 stop light loss. This is a great filter for blurring motion a lot on a sunny day. Example: In daylight maybe the slowest shutter speed available with a filter is 1/60 sec' at F/22. By adding the PRO ND 200 a shutter speed of 4 full seconds would be possible.

PROND 500**9-STOPS LIGHT LOSS****▲ With PRO ND Filter**

The HOYA PRO ND 500 is a dark neutral density filter with a filter factor of 500. This filter factor converts to a 9 stop light loss. This is a great filter for extreme blur effects in running water or other moving subjects. Example: In daylight maybe the slowest shutter speed available with a filter is 1/60 sec' at F/22. By adding the PRO ND 500 a shutter speed of 8 full seconds would be possible.

PROND 1000**10-STOPS LIGHT LOSS****▲ With PRO ND Filter**

The HOYA PRO ND 1000 is an extremely dark neutral density filter with a filter factor 1000. This filter factor converts to a 10 stop reduction on the amount of light entering the lens. With this extreme filter motion is greatly blurred or depending on the speed some moving subjects will disappear altogether. With a ND filter as strong as the PRO ND 1000 shutter speeds as slow as 16 seconds or more are possible in daylight.

Available sizes (mm):

49

52

55

58

62

67

72

77

82

ND X400

8 2/3-STOPS LIGHT LOSS

Blurring time to create beautiful



▲ With ND X400 Filter



▲ Without Filter

The ND 400 can be used in many creative ways to achieve super slow shutter speeds in daylight. It can create beautiful blurred motion or render moving subjects invisible.

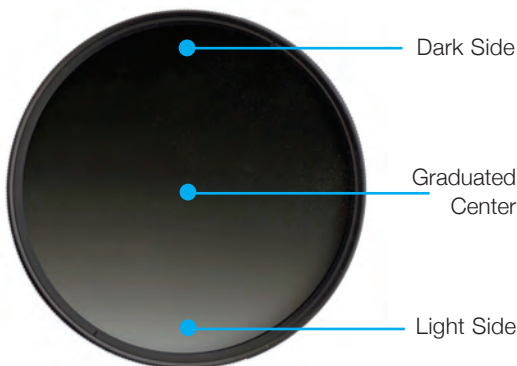
Photographing solar eclipses and ultra-bright light sources can be extremely dangerous. This filter reduces light values by 9 stops to less than 1/500th of its original intensity and allows safe photography. It can also be used to achieve super slow shutter speeds in daylight to render moving subjects invisible.

Available sizes (mm):

49	52	55	58	62	67	72	77	82
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GRADUATED ND10

Perfect for Nature Scenes and Portraiture



This filter is great for Landscape photography because it can darken blown-out skies for a more balanced exposure. The GRADUATED ND 10 filter reduces the amount of light by 3 Stops in the darkest area and 1 stop in the lightest area. The filter also allows for wider apertures or slower shutter speeds to be used over-all.

Average
Transmission (%)

	Light Side	Center	Dark Side
t=2.2 (52mm / 58mm)	53±5 (f≈1.4)	30±5 (f≈1.8)	12±5 (f≈2.8)
t=3.0 (77mm / 82mm)	51±5 (f≈1.4)	20±5 (f≈2.2)	8±5 (f≈3.6)



▲ With GRADUATED ND10



▲ Without Filter

Available sizes (mm):

52

58

77

82

UV & IR Cut FILTER

Blocks both UV rays and IR rays



▲ With UV & IR Cut Filter



HOYA has introduced the new Hoya UV & IR Cut filter in 49mm through 82mm sizes. This specialized filter has the ability to cut out both UV rays below 390nm and IR rays above 700nm leaving just the light rays in the visible spectrum passing through the filters and into the camera. This is important because CCD and CMOS sensors are extremely susceptible to UV and IR rays just outside the visible spectrum that have a very negative impact on image quality.

The Hoya UV & IR Cut filter blocks both UV rays and IR rays yielding clearer and sharper pictures outdoors. This filter can reduce the effects of atmospheric haze to an even greater degree than a standard UV filter.

The Hoya UV & IR's light transmission curve shows the sharp-cut nature of the filter glass and coatings as well as the consistent light transmission in the visible spectrum. This curve demonstrates a more even light transmission than the closest competitor. This means that sharper images with more depth and finer, richer color gradations are possible with the Hoya UV & IR Cut filter.

Available sizes (mm):

49	52	55	58	62	67	72	77	82
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Variable Density FILTER

The creative possibilities are endless



▲ With Variable Density

Without Filter ►



The Hoya Variable Density filter uses two polarizing layers to control the amount of light that passes through the filter and into the camera lens. At its minimum effect the filter passes 1/3 of the light in a scene. That is equal to 1.5 stops on the aperture or shutter speed. At its maximum effect the filter passes just 1/400 of the light in a scene. That is equal to 9 stops on the aperture or shutter speed.

After the filter is mounted on the lens, turning the filter ring between “MINI” and “MAX” can greatly control the amount of light entering the lens. With the Hoya Variable Density filter it is possible to shoot with fast lenses like a 50mm f/1.4 lens wide open at f/1.4 in full sun for a very shallow depth of field. Or, to slow down the shutter speed to where the shutter can be open for several seconds in full sunlight. This is enough to create artistic blurring shots of motion on water, cars, people or almost anything that moves. The creative possibilities are endless.

The Hoya Variable Density filter uses high-quality optical glass from Hoya Corporation, the worlds largest optical glass manufacturer.

Available sizes (mm):

52	55	58	62	67	72	77	82
----	----	----	----	----	----	----	----

HMC UV(C) FILTER

A multi-purpose fine-weather filter



Heat-resistant / High-Transparency glass

The HOYA UV (C) filter uses the highest quality heat-resistant tempered glass, which creates a smooth, clear image.

This filter cuts out all range of UV rays to give an astounding sharpness and clarity without the least affect on color balance. Constant use for lens protection is recommended.

These popular filters are renowned for their ability to minimize reflection on filter surfaces which reduces flare and ghosting. With an average light transmission of over 97%, the HOYA HMC filters are engineered to enhance the performance of today's multi-coated lenses.



HMC UV(C)

A multi-purpose fine-weather filter



▲ With UV(C) Filter



▲ Without Filter



Available sizes (mm):

37	40.5	43	46	49	52	55	58	62	67	72	77	82	86
----	------	----	----	----	----	----	----	----	----	----	----	----	----

UV(O)

A multi-purpose fine-weather filter



▲ With UV(O) Filter



▲ Without Filter

Absorbs the ultraviolet rays which often make outdoor photographs hazy and indistinct. A multi-purpose, fine-weather filter for color as well as black and white films. Also serves as a permanent lens protector.

Available sizes (mm):

37	40.5	43	46	49	52	55	58	62	67	72	77	82	86	95
----	------	----	----	----	----	----	----	----	----	----	----	----	----	----

SKYLIGHT 1B

For outdoor color photography



▲ With SKYLIGHT 1B Filter



▲ Without Filter

Reduces excessive bluishness that frequently occurs in outdoor color photography, especially in open shade under a clear, blue sky. The absorption peak is in the range which corresponds to the film's green spectrum. This means outstanding outdoor shots with superb color balance and clarity under all conditions. Also keeps skin tones free of colored reflections from nearby objects such as the shade of trees.



PL/CIR-PL

Color and contrast enhancement



▲ With PL Filter



▲ Without Filter

What is a polarizing filter?

Light rays which are reflected by any surface can become polarised so polarising filters are used to select which light rays enter your camera lens. CIRCULAR PL filters allow you to remove unwanted reflections from non-metallic surfaces such as water, glass etc. They also enable colors to become more saturated and appear clearer with better contrast. This effect is often used to increase the contrast and saturation in blue skies and white clouds. HOYA's polarising filters will not affect the overall color balance of a shot.

How to select the correct Polarizing Filter

Two kinds of polarizing filters are the PL (Linear Polarizing) and CIR-PL (Circular Polarizing) filters which have the same effect of reducing glare, however, there are differences in the way each works in combination with your specific camera so it is important to research and choose the correct version of filter for your camera.

Many of today's cameras use semi-silvered mirrors or prisms to split the light (a.k.a. beam) entering the viewfinder in order to calculate exposure and focusing distance. PL filters can sometimes interact with these light controlling devices to give unpredictable exposure or focusing. If your camera, whether auto or manual, is equipped with this kind of device, we recommend using a CIR-PL filter.

Both types of filters allow you not only to remove unwanted reflections from non-metallic surfaces such as water, glass etc., but also filter out atmospheric haze enabling colors to become more saturated and appear clearer with a much sharper contrast. These effects will prove to be invaluable to photographers at any level of interest.



▲ With CIR-PL Filter



▲ Without Filter

RED ENHANCER (INTENSIFIER)

Enhance red, orange and brown



▲ With RED ENHANCER Filter



▲ Without Filter

Also known as a “didymium” filter, this is used to enhance red, orange and brown subjects to give more color saturation and contrast, while having very little effect on other colors. It can be used in many situations such as architecture where certain building features need emphasizing, or for landscapes to enhance foliage and rocky features.

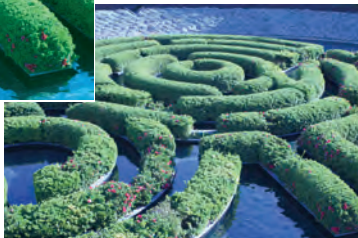
GREEN ENHANCER (GREEN FIELD)

Improve outdoor shots



▲ With GREEN ENHANCER

Without Filter ▶



Intensifies and enhances colors in the Green region of the spectrum without adversely affecting other colors. It is particularly useful for improving outdoor shots which include nature, flowers, landscapes and water. Combination use with PRO 1 UV (0) or PL-Circular is recommended for increased contrast and sharpness.

BLUE ENHANCER (BLUE INTENSIFIER)

Brighten landscapes



▲ With BLUE ENHANCER

Without Filter ▶



Intensifies and enhances colors in the Blue region of the spectrum without adversely affecting other colors. It is particularly useful for brightening seascapes and partial or cloudy skies, but also suitable for when, due to the sun's direction, polarizing filters are ineffective in increasing the saturation of a blue sky. For increased contrast Hoya recommends using the Blue Enhancer with a circular polarizer filter.

PORTRAIT

Make skin tones more vivid and clear



▲ With PORTRAIT Filter



▲ Without Filter

Enhances pink and reduces both yellow and orange to make human skin tones more vivid and clear. Combination use with UV is ideal when shooting under fine blue skies.

FL-W

Correct greenish tones



▲ With FL-W Filter

Without Filter ►



Used to correct the greenish tone that appears when daylight type film is used under fluorescent lighting. FL-W is for use with warm white or white type fluorescent lamps. It is recommended that auxiliary light sources be used when long exposures become necessary due to insufficient light.

FL-DAY

Correct greenish tones



▲ With FL-DAY Filter

Without Filter ►



Used to correct the greenish tone that appears when daylight type film is used under fluorescent lighting. FL-DAY is for use with daylight type fluorescent lamps. It is recommended that auxiliary light sources be used when long exposures become necessary due to insufficient light.

80A • 80B • 80C

Light balancing filters



▲ With 80A



▲ Without Filter



▲ With 80B

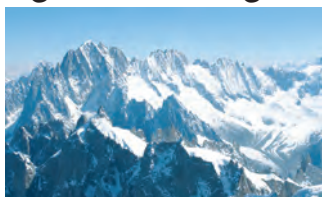


▲ With 80C

These are color conversion filters for the use of daylight type color film with artificial light sources. 80A increases the color temperature from 3200°K to 5500°K for use with 3200°K lamps. 80B increases the color temperature from 3400°K to 5500°K for use with photoflood lamps. 80C increases the color temperature from 3800°K to 5500°K for use with clear flash bulbs.

82A • 82B • 82C

Light balancing filters



▲ With 82A



▲ Without Filter



▲ With 82B



▲ With 82C

These are light balancing filters used to increase the color temperature slightly for a cooler (bluer) tone. Corrects the tendency toward reddish tones. As an example, select the 82B when using tungsten Type B film (3200°K) with ordinary household 100W electric bulbs (2900°K). These filters are also used to prevent the reddish tones in early morning or late evening light for natural skin tones. These filters can be used together, but do not mix the 81 and 82 series filters since they cancel each other out.

81A • 81B • 81C

Decrease color temperatures



▲ With 81A



▲ Without Filter



▲ With 81B



▲ With 81C

These are light balancing filters used to decrease the color temperature slightly for a warmer (redder) tone. Corrects the tendency toward bluish tones. For example, the 81A should be selected when using tungsten type B color film (3200°K) with photoflood lamps (3400°K). These filters can be used together.

85 • 85B • 85C

Color conversion filters



▲ With 85



▲ Without Filter



▲ With 85B

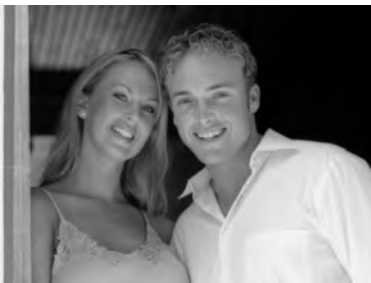


▲ With 85C

These are color conversion filters for the use of tungsten type color films in daylight. 85 decreases the color temperature from 5500°K to 3400°K for the use of Type A color film. 85B decreases the color temperature from 5500°K to 3200°K for the use of Type B color film. 85C decreases the color temperature from 5500°K to 3800°K. The effect obtained is the same as with daylight type color film used in daylight.

K2 (YELLOW)

For clear contrast



▲ Without Filter

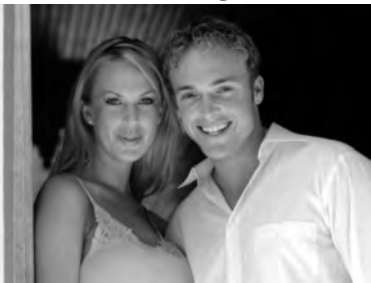


◀ With K2 Filter

Especially useful for clear contrast between blue sky with clouds and foreground. Provides a natural tonal rendition. Often used for subjects at intermediate distances.

G (ORANGE)

For balancing contrast



▲ Without Filter



◀ With G Filter

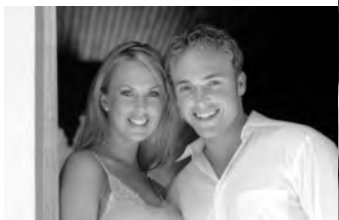
Increases contrast between reds and yellows. Particularly useful for distant outdoor shots taken with a telephoto lens. Also useful in color photography for spectacular sunsets, seascapes, etc.

25A (RED)

Increases contrast



▲ Without Filter



◀ With 25A Filter

Especially effective for increasing contrast. Ideal for dramatic cloud effects in landscapes. Can also be applied creatively in color and infrared photography.

X0 (YELLOW GREEN)

Great for outdoor portraits



▲ Without Filter

◀ With X0 Filter

Used primarily for black and white photography. X0 is highly effective for outdoor portraits because red is rendered dark while green appears lighter. Great for correcting skin tones, bringing out facial expressions in close-ups and emphasizing the feeling of liveliness.

X1 (GREEN)

Great for indoor portraits



▲ Without Filter

◀ With X1 Filter

Used primarily for black and white photography. X1 is highly effective for indoor portraits under tungsten lighting.

STAR-4 • STAR-6 • STAR-8

Add a dramatic cross flare



▲ With STAR-4 Filter



▲ With STAR-6 Filter



▲ Without Filter

◀ With STAR-8 Filter

STAR-4 adds a dramatic four-cross flare to very bright areas, giving a soft-focus effect. Ideal for photographs of ladies wearing jewelry or other objects with strong reflections. STAR-6 (six-pointed light flares) and STAR-8 (eight-pointed star flares) can also be used for a variety of effects.

CENTER-SPOT

Center focus for portraits



▲ With CENTER-SPOT Filter



▲ Without Filter

A close-up lens with a hole in the center. The periphery of the picture is rendered a delicate, soft-focus effect while the central image is sharply focused.

SEPIA A • B

Give a nostalgic sepia color effect



▲ With SEPIA A Filter



▲ Without Filter

These two filters give a nostalgic effect to otherwise ordinary color photographs. Sepia tones are produced across the whole image, as if taken many years ago in Black & White, having then discolored with age. Sepia B has a stronger effect than Sepia A.

Filter Factors

Since photographic filters absorb light, exposure must be increased to compensate for the effective light absorbed. The number by which the exposure must be increased for a particular filter used with a particular film is called the filter factor.

While these factors for basic applications are given below, as well as on the filter instruction sheet, the factor will vary according to shooting conditions. The precise filter factor is determined by considering the film type and specific light source. Therefore, filter factors indicated are for your reference only. The filter factor and exposure compensation required is as follows:

	Filter factor	f-stop
UV(0)	1	0
1B	1	0
PL	3~4	1 2/3~2
PL-Cir	3~4	1 2/3~2
FL-W	2	1
FL-Day	2	1
80A	2.4	1 1/3
80B	2	1
80C	1.9	1
85	2	1
85B	2.1	1
85C	1.8	1
82A	1.3	1/3
82B	1.4	1/2
82C	1.5	2/3
81A	1.4	1/2

	Filter factor	f-stop
81B	1.4	1/2
81C	1.5	2/3
K2(Y)	2	1
G(0)	2.5	1 1/3
25A(R)	8	3
X0(YG)	2.5	1 1/2
X1(G)	4	2
ND×2	2	1
ND×4	4	2
ND×8	8	3
Intensifier	1.4	1/2
Green Field	2.5	1 1/3
Blue Intensifier	2.5	1 1/3
Portrait	1.15	1/5
Warm	1.4	1/2

The Production Process Of Hoya Filters

Automatic V-blender



Direct pressing machine



Continuous annealing furnace



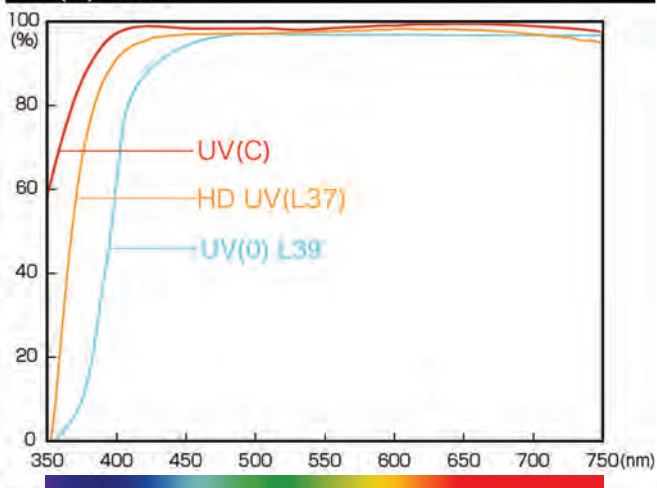
High speed polishing machine

Vacuum evaporator

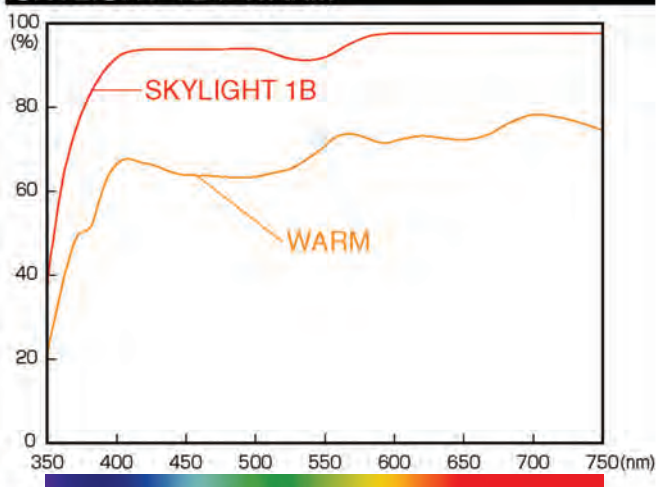


TRANSMISSION CURVES

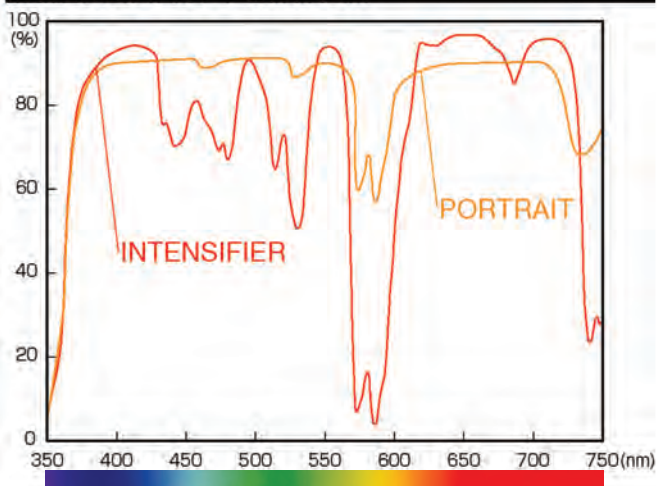
UV(0)L39 /



SKYLIGHT 1B / WARM

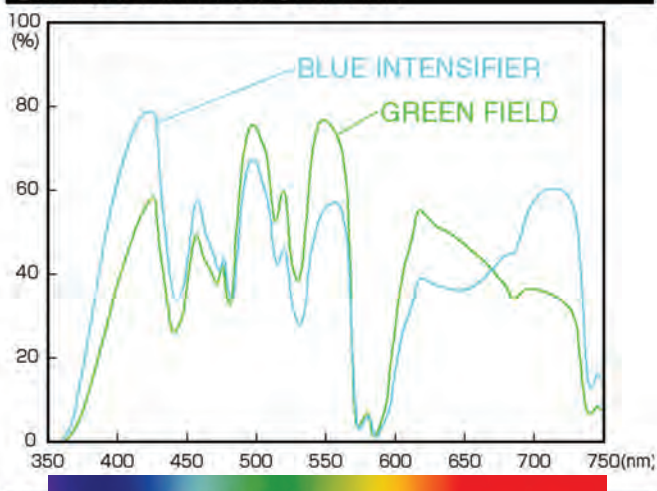


INTENSIFIER / PORTRAIT

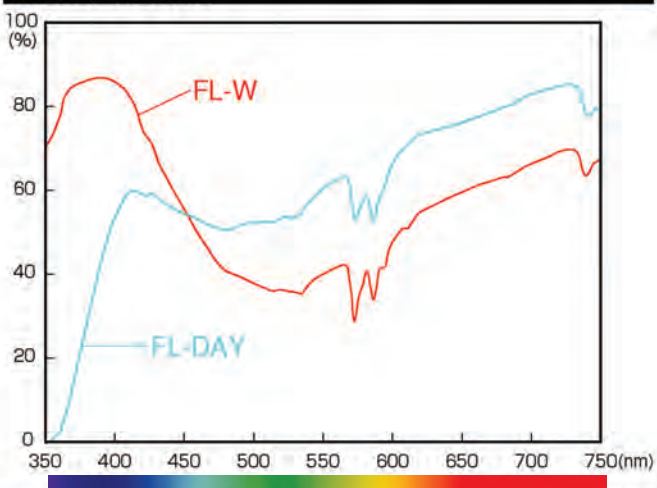


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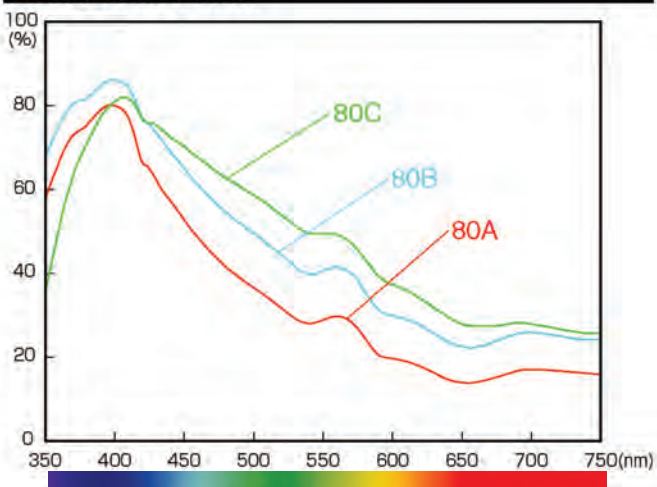
GREEN FIELD / BLUE FIELD



FL-W / FL-DAY

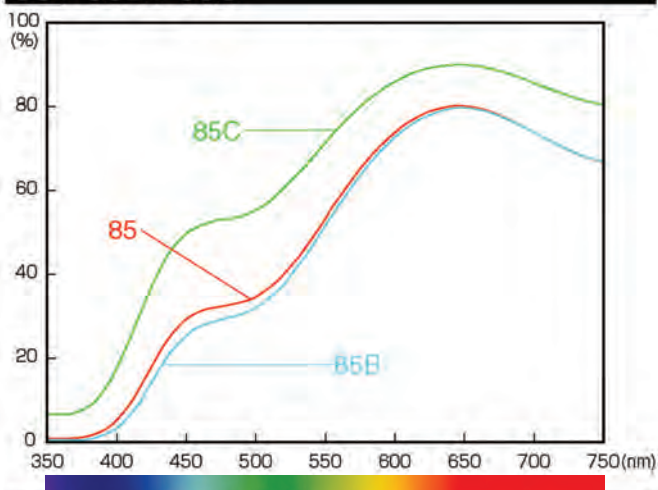


80A / 80B / 80C

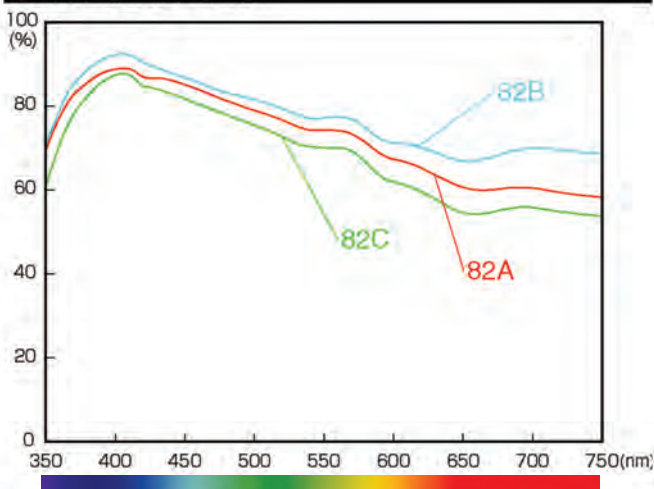


TRANSMISSION CURVES

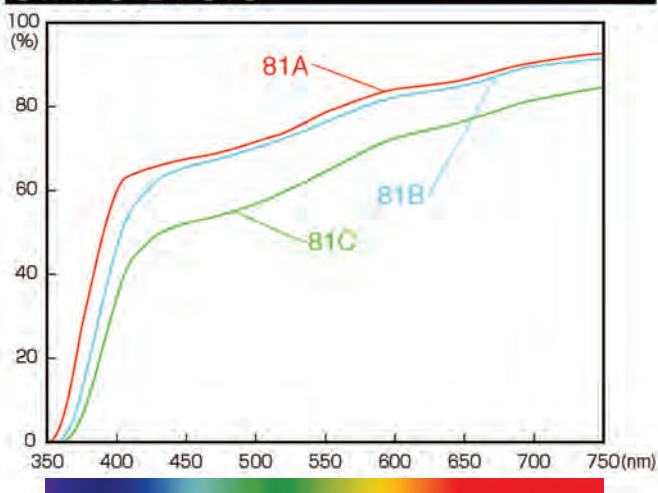
85 / 85B / 85C



82A / 82B / 82C

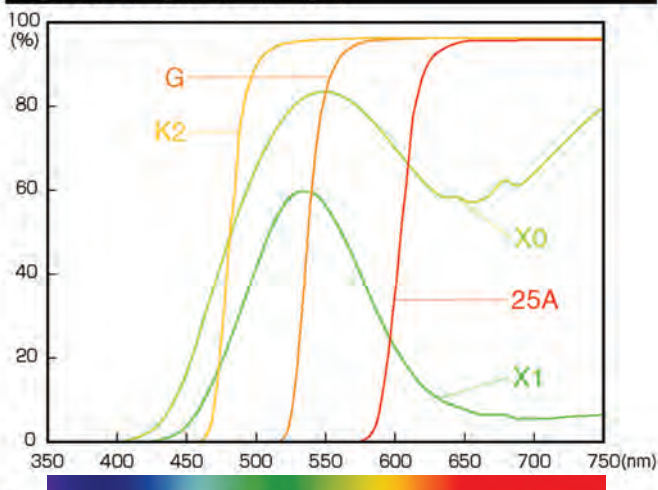


81A / 81B / 81C

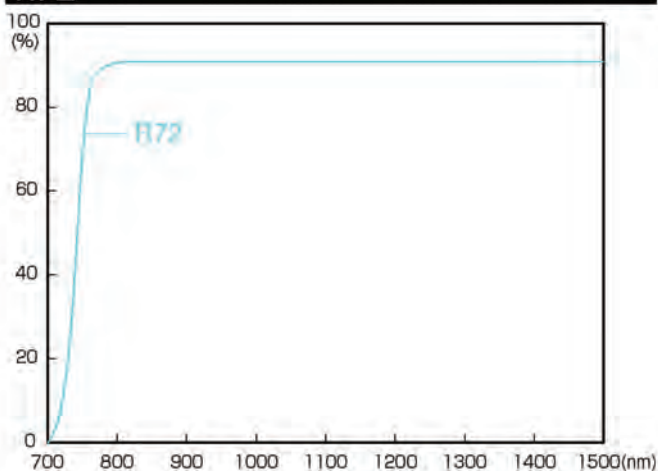


TRANSMISSION CURVES

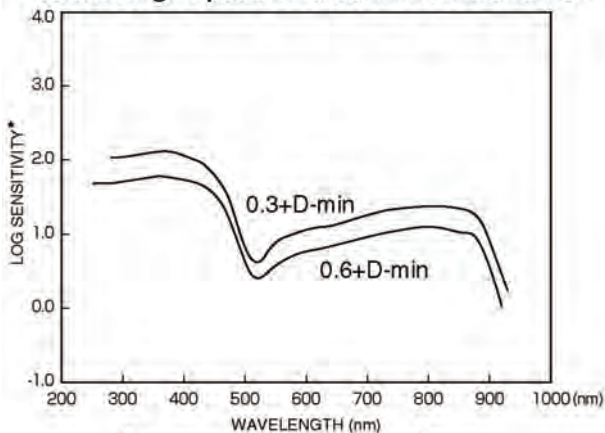
X0 / X1 / G / K2 / 25A



R72



Spectral-Sensitivity Curves for KODAK High Speed Infrared Film / HIE and HSI



*Sensitivity = reciprocal of exposure (args/cm²) required to produce specified density

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Filter Size List

SIZE	COATING	37.0	39.0	40.5	43.0	46.0	49.0
HD FILTER SERIES							
HD UV(O)	HD	●		●	●	●	●
HD PROTECTOR	HD	●		●	●	●	●
HD CIR-PL	HD	●		●	●	●	●
PRO1D DIGITAL FILTER SERIES							
PRO1D UV(O)	DMC	●	●	●	●	●	●
PRO1D PROTECTOR	DMC	●		●	●	●	●
PRO1D CIRCULAR PL	DMC	●		●	●	●	●
PRO1D PRO SOFTON	MC*						
PRO1D STAR-4	SMC						
PRO1D CLOSE-UP No.3	HMC						
HRT FILTERS							
CIR-PL UV		●					●
GENERAL FILTERS							
UV (C)	HMC	●		●	●	●	●
UV (O)	HMC	●		●	●	●	●
SKYLIGHT 1B	HMC	●			●	●	●
PL-CIR							
PL-CIR	HMC	●		●	●	●	●
CIR-PL SLIM		●		●	●	●	●
PL		●	●	●	●	●	●
DIGITAL FILTER KIT2		●		●	●	●	●
RED ENHANCER (INTENSIFIER)							●
GREEN ENHANCER (GREENFIELD)							●
BLUE ENHANCER(BLUE INTENSIFIER)							●
PORTRAIT							●
FL-W	HMC					●	●
FL-DAY	HMC					●	●
80A, B, C	HMC					●	●
81A, B, C	HMC					●	●
82A, B, C	HMC					●	●
85A, B, C	HMC					●	●
Y52	HMC						●
K2, G, 25A	HMC					●	●
XO, X1	HMC					●	●
PRO ND							
PRO ND 2	PRO ND						●
PRO ND 4	PRO ND						●
PRO ND 8	PRO ND						●
PRO ND 16	PRO ND						●
PRO ND 32	PRO ND						●
PRO ND 64	PRO ND						●
PRO ND 100	PRO ND						●
PRO ND 200	PRO ND						●
PRO ND 500	PRO ND						●
PRO ND 1000	PRO ND						●
GRADATED ND 10							
SPECIAL EFFECT FILTERS							
CENTER SPOT						●	●
STAR-4 (CROSS SCREEN)						●	●
STAR-6, STAR-8						●	●
NDX2	HMC			●		●	●
ND X4, ND X8	HMC	●		●	●	●	●
ND X400	HMC						●
HALF ND X4							●
VARIABLE DENSITY							
UV&IR CUT	HMC						●
FOG FILTER A, B						●	●
FOG FILTER A+B					●	●	●
DIFFUSER		●	●	●	●	●	●
DUTO			●			●	●
SOFTNER A, B							●
SPECTRAL CROSS							●
CLOSE-UP +1,+2,+3,+4	HMC					●	●
CLOSE-UP +1,+2,+3,+4		●		●	●	●	●
CLOSE-UP SET(+1,+2,+4)	HMC					●	●
CLOSE-UP SET(+1,+2,+4)		●		●	●	●	●
MACRO CLOSE UP						●	●
INFRARED (R72)						●	●
MULTI LENS HOOD							●

FILTER SIZE LIST

[illegible]

HOYA
FILTERS

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「To the center of the galaxy」

International Filter Photo Contest 2012-2013 Jury Special Prize