

This is the Comprehensive
Digital & General Photography Review
Certified Digital Designer
Professional Certification Examination Review



Within this presentation – We will use specific names and terminologies. These will be related to specific products, software, brands and trade names.

ADDA does not endorse any specific software or manufacturer.

It is the sole decision of the individual to choose and purchase based on their personal preference and financial capabilities.



the Profession

- It is about the world vision and expression through a lens
- It is about how light and color can change the results
- It is about images which can cause us feel emotions or to act or react
- It is about images – manipulated in multiple ways
- It is mental conception – transferred through graphical effects
- It is about creating memories with digital media
- It is expressing complicated ideas through visual applications
- **THIS is what we call DIGITAL PHOTOGRAPHY**

Digital & General Photography Section





Acronyms

- **ADDA** **American Digital Design Association** **American Design Drafting Association**
- **SLR** Single Lens Reflex Camera
- **ISO** **International Standards Organization**. Used instead of ASA as prefix to a cameras sensitivity to lights. The scale is identical to the ASA scale .
- **LCD** Liquid Crystal Display
- **TTL** Through the Lens



Acronyms

- **RAW**
Raw image format, contains **minimally processed data** from the image sensor of a digital camera or image scanner. Raw files are so named because they are not yet processed and ready to be used with a bitmap graphics editor , computer, or printing machine.
- **PNG**
Portable Network Graphics (PNG) is a **bitmapped image format** that employs lossless data compression. PNG was created to improve upon and replace the GIF format, as an image-file format not requiring a patent license
- **GIF**
The **Graphics Interchange Format (GIF)** is an **8-bit-per-pixel bitmap image format** that was introduced by CompuServe in 1987 and has since come into widespread usage on the World Wide Web due to its wide support and portability.
- **PPI**
Pixels per inch (PPI) or **pixel density** is a measurement of the resolution of a computer display or image size produced by a digital camera, related to the size of the display in inches and the total number of pixels in the horizontal and vertical directions. This measurement is often referred to as dots per inch (DPI), though that measurement more accurately refers to the resolution of a computer printer. PPI may also be used to describe the resolution of an image scanner or digital camera; in this context, it is synonymous with samples per inch.



Acronyms

- **LAB** The coordinates of the **Hunter 1948 L, a, b color space** are *L*, *a*, and *b*
- **ACE** In computing, **ACE** is a **proprietary data compression archive file format** developed by Marcel Lemke, and later bought by e-merge GmbH. ACE offers superior compression compared to the ZIP file format, at the cost of a lower compression speed.
- **AWB** **Average White Balance** – (Auto White Balance) In photography and image processing, **color balance** (sometimes **gray balance**, **neutral balance**, or **white balance**) refers to the adjustment of the relative amounts of red, green, and blue primary colors in an image such that neutral colors are reproduced correctly. Color balance changes the overall mixture of colors in an image and is used for generalized color correction.
- **EXIF** **Exchangeable image file format** Information that accompanies an image.
- **AP** **Aperture Priority** (Aperture & F-Stop are the same)
- **AE/AF** **Auto-Exposure / Auto Focus**



Definitions

➤ **Day Light / Sun Light** **Daylight or the light of day** is the combination of all direct and indirect sunlight outdoors during the daytime (and perhaps twilight). This includes direct sunlight, diffuse sky radiation, and (often) both of these reflected from the Earth and terrestrial objects. Sunlight scattered or reflected from objects in outer space (that is, beyond the Earth's atmosphere) is generally not considered daylight. Thus, moonlight is never considered daylight, despite being "indirect sunlight."

Sunlight, in the broad sense, is the total spectrum of the electromagnetic radiation given off by the Sun.

On Earth, sunlight is filtered through the atmosphere, and the solar radiation is obvious as daylight when the Sun is above the horizon. This is usually during the hours known as *day*.

When the direct radiation is not blocked by clouds, it is experienced as **sunshine**, a combination of bright light and heat. Sunlight may be recorded using a sunshine recorder.

Direct sunlight gives about 93 lumens of illumination per watt of electromagnetic power, including infrared, visible, and ultra-violet.

➤ **Tungsten** A type of lighting. A **tungsten type lamps** emits more warm (red, yellow) light.

➤ **Fluorescent** A type of lighting. Common **fluorescent lights** have a distinct color spectrum and color spikes that will affect the color of your target. Fluorescent lights also flicker. As a result of these issues, occasionally you must find a way to eliminate the overhead fluorescent lighting when it's mixed with another light source. The White Balance menu has a fluorescent setting.

Definitions



➤ Color Temperature

Color temperature is a characteristic of visible light that has important applications in photography, videography, publishing and other fields. The color temperature of a light source is determined by comparing its chromaticity with a theoretical, heated black-body radiator. The temperature (usually measured in Kelvin (K)) at which the heated black-body radiator matches the color of the light source is that source's color temperature; for a black body source, it is directly related to Planck's Law.

➤ Kelvin (K)

The **Kelvin (symbol: K)** is a unit increment of temperature and is one of the seven SI base units. The **Kelvin scale** is a thermodynamic (absolute) temperature scale where absolute zero, the theoretical absence of all thermal energy, is zero (0 K).

The Kelvin scale and the Kelvin are named after the British physicist and engineer William Thomson, 1st Baron Kelvin (1824–1907), who wrote of the need for an “absolute thermometric scale” for color temperatures of light.

➤ F Stop

In optics, the **f-number** (sometimes called **focal ratio**, **f-ratio**, or **relative aperture**) of an optical system expresses the diameter of the entrance pupil in terms of the effective focal length of the lens; in simpler terms, the **f-number** is the focal length divided by the aperture diameter. It is a dimensionless number that is a quantitative measure of lens speed, an important concept in photography.



Definitions

➤ Sensor

A **sensor** is the digital recording chip in the camera. Its technical name is a CCD, which stands for “charge coupled device”. This part of the digital camera records the image.

➤ Macro Lens

Macro photography is close-up photography; the classical definition is that the image projected on the “image plane” (i.e., film or a digital sensor) is close to the same size as the subject.

On 35 mm format (for example), the lens is typically optimized to focus sharply on a small area approaching the size of the film frame.

Most 35mm format **macro lenses** achieve at least 1:2, that is to say, the image on the film is 1/2 the size of the object being photographed.

Many 35mm macro lenses are 1:1, meaning the image on the film is the same size as the object being photographed.

➤ Histogram

A **histogram** is a graphical display of tabulated frequencies. It shows what proportion of cases fall into each of several categories. It is a digital footprint of an image.

A histogram differs from a bar chart in that it is the *area* of the bar that denotes the value, not the height, a crucial distinction when the categories are not of uniform width



Definitions

- **Overexposed**

This is an image that appears much too bright. The **highlights and colors are totally lost** and usually unrecoverable even by top software. Either the shutter speed was too long or the aperture was too wide
- **Underexposed**

Under exposure . A **picture which appears too dark** because insufficient light was delivered to the imaging system. Opposite of over exposure.
- **Pixels**

The **individual imaging element** of a CCD or CMOS sensor, or the individual output point of a display device. This is what is meant by the figures 640x480, 800x600, 1024x768, 1280x960 etc., when dealing with the resolution of a particular digicam. Higher numbers are better quality.
- **White Balance**

Refers to the **adjustment of the brightness** of the red, green and blue components, so that the brightest object in the image appears white. See also "AWB"
- **Telephoto**

This is the **focal length** that gives you the narrowest angle of coverage, good for bringing distant objects closer. (i.e. 100mm, 200mm, 500mm etc.). This would be the opposite of a wide angle lens which captures a wide area of coverage, pushing objects further away.
- **Tripod**

In photography, a **tripod** is a **three-legged stand** for a camera, used to stabilize and elevate the camera.



Definitions

➤ Soft Light

Soft light refers to light that tends to "wrap" around object, casting shadows with soft edges.

The softness of the light depends mostly on the following two factors:

~Distance. **The closer the light source, the softer it becomes.**

~Size of light source. **The larger the source, the softer it becomes.**

The softness of a light source can also be determined by the angle between the illuminated object and the 'length' of the light source (the longest dimension that is perpendicular to the object being lit). The larger this angle is, the softer the light source.

➤ Hard Light

Hard light sources cast shadows whose appearance of the shadow depends on the lighting instrument.

For example, Fresnel lights can be focused such that their shadows can be "cut" with crisp shadow edges.. That is, the **shadows produced** will have 'harder' edges with minimal transition between highlights and shadowed areas.

The focused light will produce **harder-edged shadows**. Focusing a Fresnel makes the rays of emitted light more parallel. The parallelism of these rays determines the quality of the shadows. For shadows with no transitional edge/gradient, a point light source is required.

When hitting a textured surface at an angle, **hard light will accentuate the textures and details** in an object.



Definitions

- **Louvers** **Louvers** are a source of reflecting light from a light box or other light source. Louvers may be as you expect or can be a single object placed, to interfere with direct lighting from a natural or man made source.

- **Light Reflector** In photography and cinematography, a **reflector** is an improvised or specialized reflective surface used to redirect light towards a given subject or scene.

- **Double Diffusion** In physics, chemistry and biology, diffusion denotes the mixing of two or more substances or the net motion of a substance from an area of high concentration to an area of low concentration.

- **Soft Box** A **Soft box** is a type of photographic lighting device, one of a number of photographic soft light devices.

All the various soft light types create soft diffused light by directing light through some type of diffusion material.

The best known form of bouncing source is the **umbrella light** where the light from the bulb is bounced off the inside of a white or metalized umbrella to create a soft indirect and reflected light.

A "soft box" is an enclosure around a bulb comprised of reflective side and back walls and a diffusing material at the front of the light.



Definitions

- **Fresnel Light / Lens** The **Fresnel lens** reduces the amount of material required compared to a conventional spherical lens by breaking the lens into a set of concentric annular sections known as *Fresnel zones*.
- **Light / Reflector Disk** A reflector which is a solid Circle with a mounted Flash Canister. Disk can be positioned to reflect forward or reversed.
- **Rim Light** The *back light* (a.k.a. the *rim, hair, or shoulder light*) shines on the subject from behind, often from the top, or to one side or the other. It gives the subject a outline or rim of light, serving to separate the subject from the background and highlighting contours.
- **Noise** **Noise** relates to pixels in your image that were misinterpreted. Normally occurs when you shoot a long exposure (beyond 1/2-second) or when you use the higher ISO values from 1200 or above. It appears as random groups of red, green or blue pixels. Programs such as Neat Image can remove some of this noise from an image.
- **Grain** **Film grain or granularity** is the random optical texture of processed photographic film due to the presence of small grains of a metallic silver developed from silver halide that have received enough photons. This “look” can be achieved in digital imaging by using filters in Photoshop or a similar program



Definitions

- **Fill Flash** **Fill flash** is a photographic technique used to brighten deep shadow areas, typically outdoors on sunny days, though the technique is useful any time the background is significantly brighter than the subject of the photograph.

To use **fill flash**, the aperture and shutter speed are adjusted to correctly expose the background, and the flash is fired to lighten the foreground.

Most point and shoot cameras include a **fill flash** mode that forces the flash to fire, even in bright light.
- **Curves** In image editing, a **curve** is a **remapping of image tonality**, specified as a function from input level to output level, used as a way to emphasize colors or other elements in a picture
- **Image Pixel** Same as a Pixel
- **Bit – Depth** **Bit Depth. Refers to the color or grey scale of each individual pixel.** For example a pixel with 8 bits per color (red, green and blue), gives a 24 bit image. 24 bit resolution is 16.7 million colors



Definitions

➤ Resolution

Resolution. The quality of any digital image, whether printed or displayed on a screen, depends on its resolution, or the number of pixels used to create the image.

More, smaller pixels add detail and sharpen the edges.

- ~ Optical Resolution is an absolute number that the camera's image sensor can physically record.
- ~ Interpolated Resolution adds pixels to the image using complex software algorithms to determine what color they should be.
- ~ It is important to note that interpolation doesn't add any new information to the image - it just makes it bigger!

➤ Color Balancing

Color Balance. The accuracy with which the colors captured in the image, match the original scene. The White Balance menu can help with color balance.



Definitions

- **Primary Color** **Primary colors** are sets of colors that can be combined to make a useful range (gamut) of colors. For human applications, three are often used; for additive combination of colors, as in overlapping projected lights or in CRT displays, the primary colors normally used are red, green, and blue. For subtractive combination of colors, as in mixing of pigments or dyes, such as in printing, the primaries normally used are magenta, cyan, and yellow.

Any choice of primary colors is essentially arbitrary; for example, an early color photographic process, autochrome, typically used orange, green, and violet primaries.

- **Secondary Color** **This** is a color made by mixing two primary colors in a given color space. Examples (Red + Green = Yellow) (Green + Blue = Cyan) (Blue + Red = Magenta)

- **Tertiary color** is a color made by mixing one primary color with one secondary color, in a given color space such as RGB or RYB.



Unlike primary and secondary colors, these are not represented by one firmly established name each, but the following examples include some typical names.



Definitions

➤ Interlaced

A technique of improving the picture quality of the video signal primarily on CRT devices without consuming extra bandwidth. Interlacing causes problems on certain display devices such as LCDs .

Interlaced scan refers to one of two common methods for "painting" a video image on an electronic display screen (the second is progressive scan) by scanning or displaying each line or row of pixels.

This technique uses two fields to create a frame. One field contains all the odd lines in the image, the other contains all the even lines of the image.

A PAL based television display, for example, scans 50 fields every second (25 odd and 25 even). The two sets of 25 fields work together to create a full frame every 1/25th of a second, resulting in a display of 25 frames per second.

➤ Exposure

In photography, exposure is the total amount of light allowed to fall on the photographic medium (photographic film or image sensor) during the process of taking a photograph.

Exposure is measured in lux seconds, and can be computed from exposure value (EV) and scene luminance.



Definitions

➤ Vector

Vector graphics is the use of geometrical primitives such as points, lines, curves, and shapes or polygon(s), which are all based upon mathematical equations, to represent images in computer graphics.

Vector graphics formats are complementary to raster graphics, which is the representation of images as an array of pixels, as it is typically used for the representation of photographic images.

There are instances when working with vector tools and formats is best practice, and instances when working with raster tools and formats is best practice.

There are times when both formats come together. An understanding of the advantages and limitations of each technology and the relationship between them is most likely to result in efficient and effective use of tools.

➤ Lens Hood

In photography, a **lens hood** or **lens shade** is a device used on the end of a lens to block the sun or other light source in order to prevent glare and lens flare.



Definitions



➤ Raster

In computer graphics, a **raster graphics** image or **bitmap**, is a data structure representing a generally rectangular grid of pixels, or points of color, viewable via a monitor, paper, or other display medium.

Raster images are stored in image files with varying formats (see Comparison of graphics file formats).

A bitmap corresponds bit-for-bit with an image displayed on a screen, generally in the same format used for storage in the display's video memory, or maybe as a device-independent bitmap.

Bitmap is technically characterized by the width and height of the image in pixels and by the number of bits per pixel (a color depth, which determines the number of colors it can represent).

The printing and prepress industries know raster graphics as **contones** (from "continuous tones") and refer to vector graphics as "line work".

➤ Blooming

Bloom (sometimes referred to as **light bloom** or **glow**) is a computer graphics effect used in computer games, demos and high dynamic range rendering (HDR) to reproduce an imaging artifact of real-world cameras.

The effect produces fringes (or feathers) of light around very bright objects in an image.



Some Definitions

➤ Additive Colors

An **additive color model** involves light emitted directly from a source or illuminant of some sort. The additive reproduction process usually uses red, green and blue light to produce the other colors.

Combining one of these additive primary colors with another in equal amounts produces the additive secondary colors cyan, magenta, and yellow.

Combining all three primary lights (colors) in equal intensities produces white. Varying the luminosity of each light (color) eventually reveals the full gamut of those three lights (colors). Computer monitors and televisions are the most common applications.

➤ Subtractive Colors

A **subtractive color model** explains the mixing of paints, dyes, inks, and natural colorants to create a range of colors, where each such color is caused by the mixture absorbing some wavelengths of light and reflecting others.

The color that an opaque object appears to have is based on what parts of the electromagnetic spectrum are reflected by it, or by what parts of the spectrum are not absorbed. Subtractive color systems start with white light.

Colored inks, paints or films placed between the viewer and the light source or reflective surface (such as white paper) *subtract* wavelengths from this white, and make a color. Conversely, additive color systems start with no light (black).

Light sources *add* wavelengths to make a color. In either an additive or a subtractive system, three primary colors are needed to match humans' trichromatic color vision (caused by the three types of cone cells in the eye).



Definitions

- **Concentric** objects share the same center, axis or origin with one inside the other. Circles, tubes, cylindrical shafts, disks, and spheres may be concentric. Concentric objects do not necessarily have the same radius.
- **Diaphragm**

In optics, a **diaphragm** is a thin opaque structure with an opening (aperture) at its centre.

The role of the diaphragm is to *stop* the passage of light, except for the light passing through the *aperture*, or opening. Thus it is also called a **stop** (an aperture stop, if it limits the brightness of light reaching the focal plane, or a **field stop** or **flare stop** for other uses of diaphragms in lenses).

The diaphragm is placed in the light path of a lens or objective, and the size of the aperture regulates the amount of light that passes through the lens. The centre of the diaphragm's aperture coincides with the optical axis of the lens system.

Most modern cameras use a type of adjustable diaphragm known as an **iris diaphragm**, and often referred to simply as an **iris**.



Definitions

- **Fisheye Lens** A Fisheye lens is an extreme wide angle lens which gives a curved or spherical appearance to a photograph.
- **EXIF** is a specification for the image file format used by digital cameras. The specification uses the existing JPEG, TIFF Rev. 6.0, and RIFF WAV file formats, with the addition of specific metadata tags. Exif data is information that stays with an image.
- The metadata tags defined in the Exif standard cover a broad spectrum:**
- ~ Date and time information. Digital cameras will record the current date and time and save this in the metadata.
 - ~ Camera settings. This includes static information such as the camera model and make, and information that varies with each image such as orientation, aperture, shutter speed, focal length, metering mode, and ISO speed information.
 - ~ A thumbnail for previewing



General Information

RAW A **raw image file** (sometimes written **RAW image file**) contains minimally processed data from the image sensor of a digital camera or image scanner.

Raw files are so named because they are not yet processed and ready to be used with a bitmap graphics editor or printed. Normally, the image will be processed by a raw converter in a wide-gamut internal colorspace where precise adjustments can be made before conversion to an RGB file format such as TIFF or JPEG for storage, printing, or further manipulation.

Raw image files are sometimes called **digital negatives**, as they fulfill the same role as film negatives in traditional chemical photography: that is, the negative is not directly usable as an image, but has all of the information needed to create an image. Raw image files can not be altered or changed, similarly to a real negative.

In addition to raw files from cameras, raw data from film scanners can also be referred to as digital negatives. Likewise, the process of converting a raw image file into a viewable format is sometimes called developing a raw image, by analogy with the film development.

Like a photographic negative, a digital negative may have a wider dynamic range or color gamut than the eventual final image format. The selection of the final choice of image rendering is part of the process of white balancing and color grading.



General Information

Composition RULE OF THIRDS



The Main Subject of the image

should be **positioned** in one of the **intersections** of these **imaginary lines**.

Place subject matter about one-third from the top, or one-third from the bottom.

One-third from the right side, or one-third from the left side





General Information

Copyrights & Photography

Taking a photograph while on an airplane is banned in many places, and many mass transit systems prohibit taking photographs or videos while on board buses or trains or inside of stations.

Photography and videography are also prohibited in the U.S. Capitol, in courthouses, and in government buildings housing classified information. Bringing a camera phone into one of these buildings is not permitted either.

Filming while on private property follows many restrictions. The owner of the property is permitted to film their own property. However, they must receive permission from others on the property to be allowed to film that person.

In order to film someone else's property, permission must be received from the owner.

Photographing or videotaping a tourist attraction, whether publicly or privately owned, is generally considered legal, unless explicitly prohibited by posted signs.

These laws have existed for years, and property or model releases are easily found online to use if you plan to take a photograph and sell it commercially. If it's for personal use then these releases are usually not necessary.



General Information

Copyrights & Photography

Photographing of privately-owned property that is generally open to the public (i.e. retail) is permitted unless explicitly prohibited by posted signs.

Some jurisdictions have laws regarding filming while in a hospital or health care facility. Where permitted, such filming may be useful in gathering evidence in cases of abuse, neglect, or malpractice.

One must not hinder the operations of law enforcement, medical, emergency, or security personnel by filming.

Any filming with the intent of doing unlawful harm against a subject may be a violation of the law in itself.



General Information

Copyright Act 1976

is a piece of United States copyright legislation and remains the primary basis of copyright law in the United States, as amended by several later enacted copyright provisions.

The Act spells out the basic rights of copyright holders, codified the doctrine of "fair use," and for most new copyrights adopted a unitary term based on the date of the author's death rather than the prior scheme of fixed initial and renewal terms. It became Public Law number 94-553 on October 19, 1976 and went into effect on **January 1, 1978**.

Fair use is a doctrine in United States copyright law that allows limited use of copyrighted material without requiring permission from the rights holders, such as use for scholarship or review. It provides for the legal, non-licensed citation or incorporation of copyrighted material in another author's work under a **four-factor balancing test**. It is based on free speech rights provided by the First Amendment to the United States Constitution.



General Information

Copyrights

The Current Fee for registration of an artist or writers works is \$35 Online and \$45 in paper. This does not include any fees for attorneys or professional support.

Form Needed to Apply is “VA”

If you want to copyright a current work the use of the copyright symbol is optional. However.. it is a good practice to note on the pages the information is copyrighted.

ADDA Materials state at the bottom of each sheet “ Copyright ADDA International”. This gives a firm indication to anyone the information is protected and permission should be obtained to use any portion of what they have.

If an individual did use the information, and you made the decision to pursue a lawsuit. The maximum limit of statutory damages you may win is \$150,000.00 per infraction.

This is only for the violation of the copyright law. Additional penalties and fines would apply for the Civil Damages, Loss Revenue and a multitude of other offences. In short, don't steal.



General Information

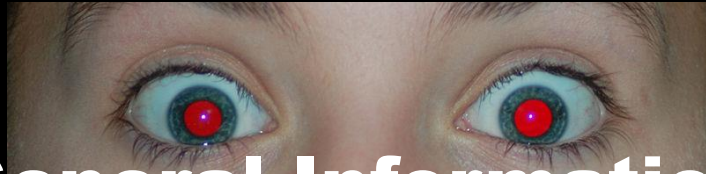
Copyrights - What Works Are Protected?

Copyright protects “original works of authorship” that are fixed in a tangible form of expression. The fixation need not be directly perceptible so long as it may be communicated with the aid of a machine or device. Copyrightable works include the following categories:

- literary works;
- musical works, including any accompanying words
- dramatic works, including any accompanying music
- pantomimes and choreographic works
- pictorial, graphic, and sculptural works
- motion pictures and other audiovisual works
- sound recordings
- architectural works

These categories should be viewed broadly. For example, computer programs and most “compilations” may be registered as “literary works”; maps and architectural plans may be registered as “pictorial, graphic, and sculptural works.”

A Copyright remains in effect for 70 YEARS beyond the death of the Holder



General Information

Red-EYE

The **red-eye effect** in photography is the common appearance of red pupils in color photographs of eyes. It occurs when using a photographic flash very close to the camera lens (as with most compact cameras), in ambient low light.

Red-eye effect appears in the eyes of humans and animals that have no tapetum lucidum, hence no **eyeshine**, [citation needed] and rarely in animals that have a tapetum lucidum. The red-eye effect is a photographic effect, not seen in nature.

Because the light of the flash occurs too fast for the pupil to close, much of the very bright light from the flash passes into the eye through the pupil, reflects off the fundus at the back of the eyeball (see diagram in Eye), and out through the pupil. In short, you're illuminating the inside of the eye.

The camera records this reflected light. The fact that the reflected light is red often is attributed to the ample blood supply of the retina and/or corium, but this is incorrect. The red-eye effect is due to the color of the fundus, which is due to melanin, a pigment, principally located in the retinal pigment epithelium (RPE).





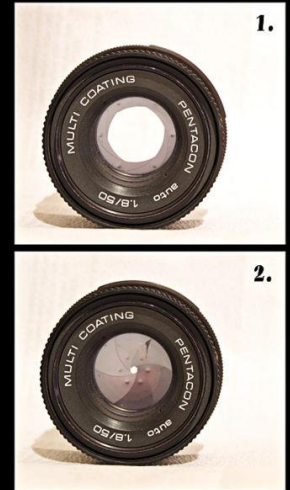
General Information

Aperture

In optics, an **aperture** is a hole or an opening through which light is admitted. More specifically, the aperture of an optical system is the opening that determines the cone angle of a bundle of rays that come to a focus in the image plane.

The aperture determines how collimated the admitted rays are, which is of great importance for the appearance at the image plane. If the admitted rays also pass through a lens, highly collimated rays (narrow aperture) will result in sharpness at the image plane, while uncollimated rays (wide aperture) will result in sharpness for rays with the right focal length only.

This means that a wide aperture results in an image that is sharp at what the lens is focused on and in front of and behind the subject are blurred. Obviously, the aperture also determines how many of the incoming rays that are actually admitted and thus how much light that reaches the image plane (the narrower the aperture, the darker the image).



General Information



FILTERS

In photography, a **filter** is a camera accessory consisting of an optical filter that can be inserted in the optical path. The filter can be a square or rectangle shape mounted in a holder accessory, or, more commonly, a glass or plastic disk with a metal or plastic ring frame, which can be screwed in front of the lens.

Filters allow added control for the photographer of the images being produced. Sometimes they are used to make only subtle changes to images; other times the image would simply not be possible without them.

The negative aspects of using filters, though often negligible, include the possibility of loss of image definition if using dirty or scratched filters, and increased exposure required by the reduction in light transmitted.

The former is best avoided by careful use and maintenance of filters, while the latter is a matter of technique; it usually will not be a problem if planned out properly, but in some situations does make filter use impractical.

General Information



FILTERS

Clear filters, also known as **window glass** filters or **optical flats**, are completely transparent, and perform no filtering of incoming light at all. The only use of a clear filter is to protect the front of a lens.

UV filters are used to reduce haziness created by ultraviolet light. A UV filter is mostly transparent to visible light. UV filters are often used for lens protection, much like clear filters

Color correction A major use is to compensate the effects of lighting not balanced for the film stock's rated color temperature (usually 3200 K for professional and 5500 K for daylight): The use of these filters has been greatly reduced by the widespread adoption of digital photography, since color balance problems are now often addressed with software after the image is captured. These color filters have mostly been replaced by the "White Balance" menu in a digital camera.

Color subtraction filters work by absorbing certain colors of light, letting the remaining colors through.

A **polarizing** filter, can be used to darken overly light skies. Because the clouds are relatively unchanged, the contrast between the clouds and the sky is increased.

General Information

FILTERS



A Neutral Density (ND) filter causes a reduction in light. It is a neutral filter (color) and simply reduces the amount of light that passes through it. These filters are used in cases where you need LONG shutter speeds to blur a scene; i.e. water falls.

A cross screen filter, (a star filter) creates a star pattern, in which lines radiate outward from bright objects or pinpoints of light like a candle.

A diffusion filter (also called a softening filter) softens subjects and generates a dreamy haze.

Transparent diffusion filter is made of many tiny globs of acrylic deposited on one surface which act as micro-lenses to diffuse the light. This can be accomplished by using clear nail polish on a plain glass filter.

Grid or Netting filters come in Various widths, colors (often black or white), and grid shapes (typically diamonds or squares) and spacing of netting, usually made from nylon, are used to provide soft diffusion effects.

Diopters and Split Diopters (are not actually filters) they are simple single or two-element lenses used to assist in close-up and macro photography. They provide some number of positive optical diopters, which magnify the subject and allow objects very close to the lens to be brought into focus.

General Information

ISO FILM Speed Chart

This chart is included as an educational artifact only. These film types, speeds, and brands often come up in Photographic History conversations, courses, and readings. These films have provided the foundation for many digital camera features and software menus.



ISO arithmetic scale (old ASA scale)	ISO log scale (old DIN scale)	GOST (Soviet pre-1987)	Example of film stock with this nominal speed
6	9°		original Kodachrome
8	10°		
10	11°		Kodachrome 8 mm film
12	12°	11	Gevacolor 8 mm reversal film
16	13°	11	Agfacolor 8 mm reversal film
20	14°	16	Adox CMS 20
25	15°	22	old Agfacolor, Kodachrome 25
32	16°	22	Kodak Panatomic-X
40	17°	32	Kodachrome 40 (movie)
50	18°	45	Fuji RVP (Velvia)

General Information

ISO FILM Speed Chart.



ISO arithmetic scale (old ASA scale)	ISO log scale (old DIN scale)	GOST (Soviet pre-1987)	Example of film stock with this nominal speed
64	19°	45	Kodachrome 64, Ektachrome-X
80	20°	65	Ilford Commercial Ortho
100	21°	90	Kodacolor Gold, Kodak T-Max (TMX)
125	22°	90	Ilford FP4, Kodak Plus-X Pan
160	23°	130	Fuji Pro 160C/S, Kodak High-Speed Ektachrome
200	24°	180	Fujicolor Superia 200
250	25°	180	
320	26°	250	Kodak Tri-X Pan Professional (TXP)
400	27°	350	Kodak T-Max (TMY), Tri-X 400, Ilford HP5



General Information

ISO FILM Speed Chart.

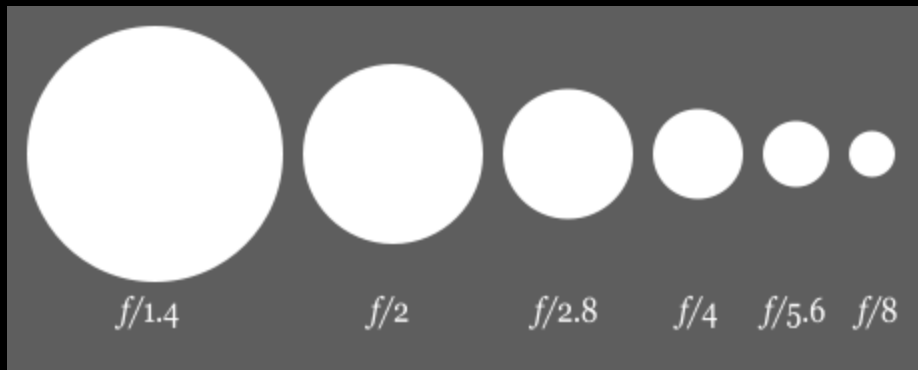
ISO arithmetic scale (old ASA scale)	ISO log scale (old DIN scale)	GOST (Soviet pre-1987)	Example of film stock with this nominal speed
500	28°	350	
640	29°	560	Polaroid 600
800	30°	700	Fuji Pro 800Z
1000	31°	700	Ilford Delta 3200 (see text below)
1250	32°		
1600	33°	1400–1440	Fujicolor 1600
2000	34°		
2500	35°		
3200	36°	2800–2880	Kodak P3200 TMAX
4000	37°		
5000	38°		
6400	39°		



General Information

F Stops

In optics, the **f-number** (sometimes called **focal ratio**, **f-ratio**, or **relative aperture**[1]) of an optical system expresses the diameter of the entrance pupil in terms of the effective focal length of the lens; in simpler terms, the f-number is the focal length divided by the aperture diameter. It is a dimensionless number that is a quantitative measure of lens speed, an important concept in photography.



On a camera, the f-number is usually adjusted in discrete steps, known as **f-stops**.

Each "stop" is marked with its corresponding f-number, and represents a halving of the light intensity from the previous stop.

This corresponds to a decrease of the pupil and aperture diameters by a factor of $\sqrt{2}$ or about 1.414, and hence a halving of the area of the pupil opening.



General Information

Rotating Lens – Swivel Lens

Swivel lens are lenses that freely rotate while still attached to a camera body.

These lens make it easy for the photographer to aim the camera without moving around too much.

Swivel lens come in different sizes and shapes.

Large ones with flashes are usually found on real cameras.

Small ones are usually hinged at the edge of a handset.

Swivel lens are also known as swiveling lens and rotating lens





General Information

Aperture and focal length

The two main optical parameters of a photographic lens are the maximum aperture of the lens and the focal length of the lens.

The focal length determines the angle of view, and the size of the image relative to that of the object, while the maximum aperture limits the brightness of the image and the fastest shutter speed usable. A popular third consideration is close focusing distance.

The maximum usable aperture of a lens is usually specified as the focal ratio or f-number, which is equal to the focal length divided by the effective aperture (or entrance pupil) diameter in the same units. The lower the number, the more light per unit area is delivered to the focal plane.

Larger apertures (smaller f-numbers) provide a much shallower depth of field than smaller apertures, other conditions being equal.

Practical lens assemblies may also contain mechanisms to deal with measuring light, secondary apertures for flare reduction, and mechanisms to hold the aperture open until the instant of exposure to allow SLR cameras to focus with a brighter image with shallower depth of field, theoretically allowing better focus accuracy.



General Information

Lens Types

Focal lengths are usually specified in millimeters (mm), but older lenses marked in centimeters (cm) and inches are still to be found.

For a given film or sensor size, specified by the length of the diagonal, a lens may be classified as:

Normal lens: angle of view of the diagonal about 50° and a focal length approximately equal to the diagonal produces this angle.

Macro lens: angle of view narrower than 25° and focal length longer than normal. These lenses are used for close-ups, e.g., for images of the same size as the object. They usually feature a flat field as well, which means that the subject plane is exactly parallel with the film plane.

Wide-angle lens: angle of view wider than 60° and focal length shorter than normal.

Telephoto lens or long-focus lens: angle of view narrower and focal length longer than normal. A distinction is sometimes made between a long-focus lens and a true telephoto lens: the telephoto lens uses a *telephoto group* to be physically shorter than its focal length.



General Information

Lens Types - The 35mm film format is so prevalent that a 90mm lens, for example, is sometimes assumed to be a moderate telephoto; but for the 7×5cm format it is normal, while on the large 5×4 inch format it is a wide-angle. In general, the smaller the film or sensor surface, the smaller the angle of view. This can be corrected with lenses with shorter focal lengths.



28 mm lens



50 mm lens

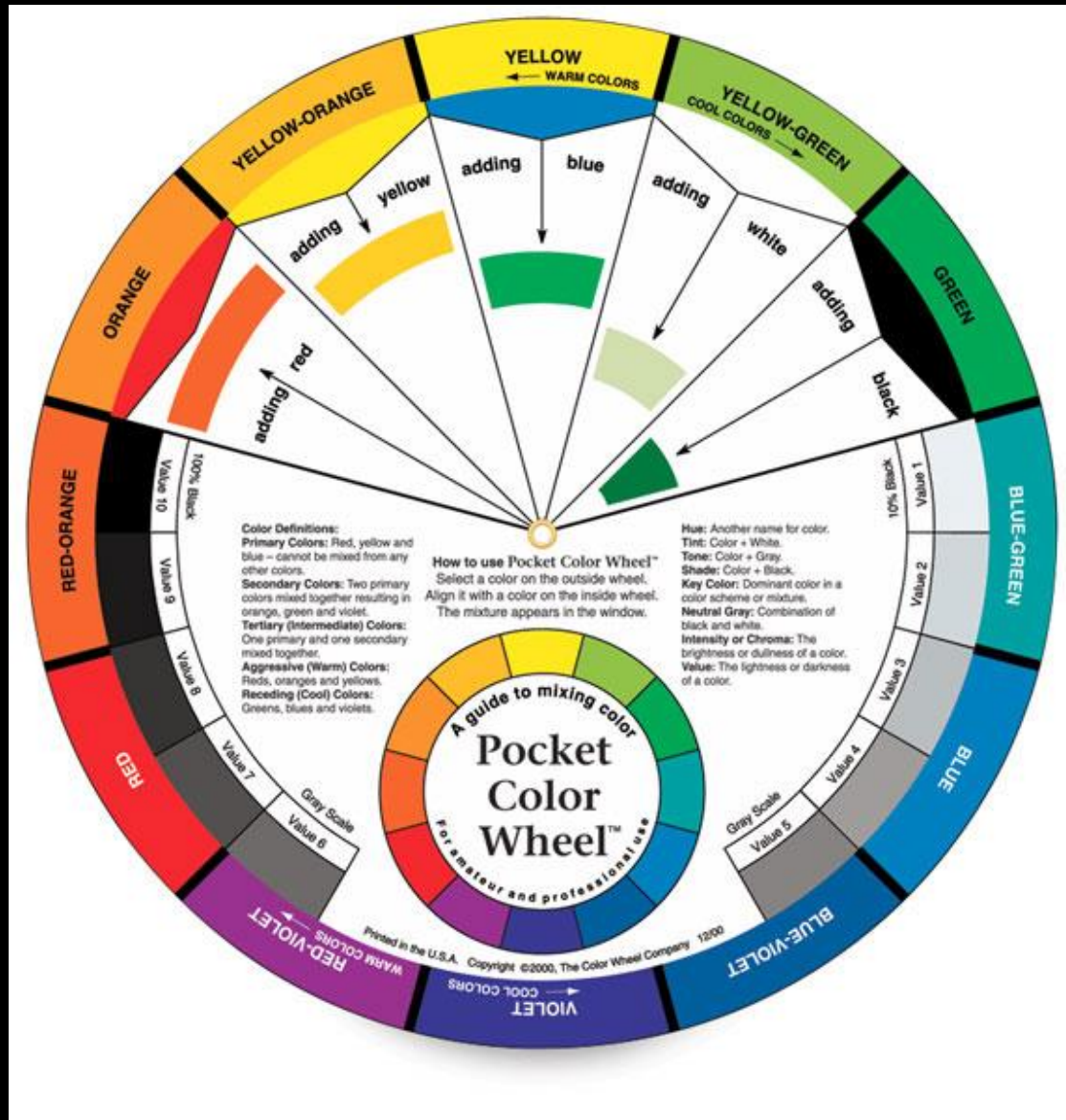


70 mm lens



210 mm lens

Artist Color Wheel





History of Photography



George Eastman (July 12, 1854 – March 14, 1932) founded the Eastman Kodak Company and invented the flexible roll of film, helping to bring photography to the mainstream.

The flexible roll film was also the basis for the invention of the motion picture film in 1888 by world's first filmmaker, Louis Le Prince, and a decade later by his followers Léon Bouly, Thomas Edison, the Lumière Brothers and Georges Méliès

Louis-Jacques-Mandé Daguerre (November 18, 1787 – July 10, 1851) was a French artist and chemist, recognized for his invention of the first successful photographic process called the daguerreotype. **The exposure time for this process took up to 15 minutes.**

In 1827, Joseph Nicéphore Niépce produced the world's first permanent photograph (known as a Heliograph). Daguerre partnered with Niépce two years later, beginning a four-year cooperation. Niépce died suddenly in 1833. The main reason for the "partnership", as far as Daguerre was concerned, was connected to his already famous dioramas





History of Photography

Due to **better chemicals and wider apertures** our modern methods of photography have reduced the exposure and development time of film photography. Many colleges, universities, and High Schools are still offering darkroom and print making classes.

Prior to modern methods color photography was **hand colored**

James Clark Maxwell contributed to the area of optics and color vision, and is credited with the discovery that color photographs could be formed using red, green, and blue filters.



In 1861 he presented the world's first color photograph during a Royal Institution lecture. He had, inventor of the single-lens reflex camera, photograph a tartan ribbon three times, each time with a different color filter over the lens.

The three images were developed and then projected onto a screen with three different projectors, each equipped with the same color filter used to take its image. When brought into focus, the three images formed a full color image.

The three photographic plates now reside in a small museum at 14 India Street, Edinburgh, the house where Maxwell was born.



History of Photography

Louis Arthur Ducos du Hauron (December 8, 1837 – August 31, 1920) was a French pioneer of color photography. He was born in Langon, Gironde and he died in Agen.

In the years following his unpublished paper of 1862 he set out practical ways of recording color images using both additive (red, green, blue) and subtractive (cyan, magenta, yellow) methods. In 1868 he patented some of his methods and in 1869 he wrote *Les Couleurs en Photographie*.

One of his earliest color photographs is the *Landscape of Southern France*, taken by the subtractive method in 1877.





History of Photography

The **Autochrome Lumière** is an early color photography process.

Patented in 1903 by the Lumière brothers in France and first marketed in 1907, it remained the principal color photography process available until it was superseded by the advent of color film during the mid 1930s

Autochromes continued to be produced as glass plates until the 1930s, when film-based versions were introduced, as in 1932, and in 1938.

While it almost completely replaced glass-plate autochromes

within three years, its success was short-lived, as manufacturers such as Kodak and Agfa began in earnest to produce the multi-layer, subtractive color films (such as Kodachrome, Agfacolor Neu and Kodacolor) which we know today.



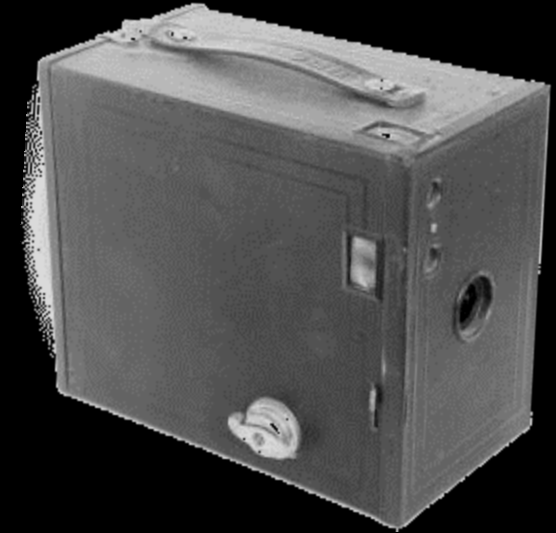


History of Photography

Box Camera

The **box camera** is, with the exception of the pin hole camera, a camera in its simplest form. The classic box camera is shaped more or less like a box, hence the name. Invented by **George Eastman**.

A box camera has a simple optical system, often only in the form of a simple meniscus lens. It usually lacks a focusing system (*fix-focus*) as well as control of aperture and shutter speeds. This makes it suitable for daylight photography only. In the 1950s, box cameras with photographic flash were introduced, allowing indoor photos.



Typical box cameras are:

- ~ The **Kodak** introduced in 1888, the first commercially successful box camera for roll film “the advertising slogan being *You press the button - we do the rest.*”
- ~ The Kodak Brownie, a long lasting series of classical box cameras using roll film.
- ~ The Ansco Panda was designed to compete directly with the Brownies. It used 620 film.
- ~ The Kodak Instamatic using 126 film, later 110 film.
- ~ The modern disposable (cardboard) camera using 135 film.



History of Photography

Instant Camera This is a type of camera with self-developing film. The most famous are those made by the Polaroid Corporation.

Polaroid no longer manufactures such cameras.

The invention of modern instant cameras is generally credited to American scientist Edwin Land, who unveiled the first commercial instant camera, the Land Camera, in 1947, 10 years after founding the Polaroid Corporation.

In February 2008, Polaroid announced it would cease production of all instant film; the company would shut down three factories and lay off 450 workers.

Sales of chemical film by all makers have dropped by at least 25% per year in this decade, and the decline is likely to accelerate. Fujifilm is now the only remaining supplier of instant film in the United States.



Tools of Photography



LENSES

- Wide Angle Lenses** (<50mm) The natural choice for landscapes, sweeping panoramas and other outdoor scenes, group shots and generally anything requiring strong perspective.
- Medium Telephoto Lenses** (85-135mm) These lenses are perfect for portraits. Compared to a 50mm lens they isolate the subject from the background more and the increased focal length slightly flattens the image and gives more a natural and flattering perspective. Popular for candid photography.
- Long Telephoto Lenses** (>135mm) Used for sports, nature or other types of documentary style photography that requires you to be close to the action but cannot be close physically be it dangerous or timid. Like portrait lenses they are great for picking out the subject from the background.



Tools of Photography

OTHER SPECIAL LENSES

- Macro** Macro lenses can focus very close allowing real size, 1:1 image ratios, ie an object 10mm in size will appear 10mm on the 35mm frame. Excellent for nice close ups of insects or flowers.
- Fisheye Lenses** Distort the perspective to create a circular “fisheye” 180° image. A very specialized lens. Picking the correct subject is necessary but when you do can produce some memorable images. Focal lengths vary, 7~16mm.
- Super Wide Angle Lenses** (<24mm) Like wide-angle but more so, but not as much as the fisheye. Great for exaggerated perspective or scenes from restricted vantage point. Favored lens of the real estate agent!



Tools of Photography

OTHER SPECIAL LENSES

Super Telephoto Lenses

(>300mm) Longer telephotos and an eye-watering price tag to match. Can be heavy due to the amount of glass they contain. Often they have a tripod mount on the lens.

Fast Lenses

A fast lens is one that has a large minimum aperture and is often a good thing. The minimum aperture might be $f/1.4$ or $f/2.8$ or whatever is appropriate for the lens compared to other lenses of the same focal length. This lens is can be used in situations where there is very dim available lighting conditions.

Obviously the larger minimum aperture requires larger glass elements and is consequently heavier and maybe bulkier than a lens one or two stops slower.

They are usually higher quality as a side-effect of the lens maker justifying the extra expense.



Tools of Photography



Flash Drive



Memory Cards



Light Box



Roll Film



Instant Film

Camera Batteries



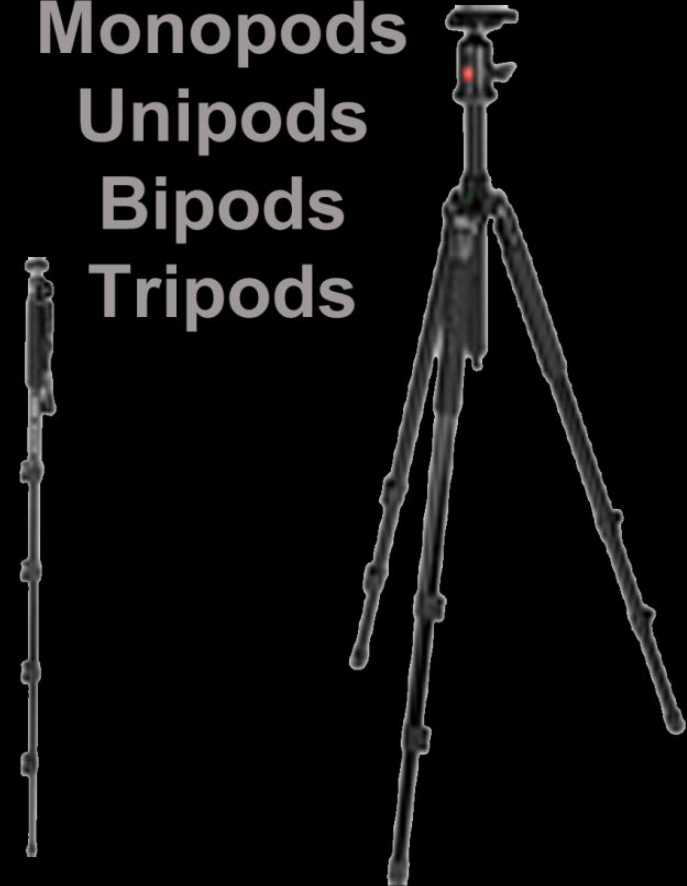


Tools of Photography



Flashes

Monopods
Unipods
Bipods
Tripods



Lens
Caps



Tools of Photography



Lens Hoods



Cases - Bags - Gear



Filter Types



Tools of Photography



**Compacts
Sub - Compacts**



**Superzoom
Point & Shoot - Disposable
SLR Digital - SLR Film**



CAMERA TYPES



This Ends the Photography Review Section