

What is aperture?

The **aperture** is the opening in the lens that allows light to enter the camera and onto the sensor or film.

The size of this opening can be adjusted by changing the aperture settings.



Take a look at the picture of a lens aperture above. Notice the adjustable blades that can move to adjust the size of the opening.

How is aperture size measured?

The size of the aperture is measured in **f-stops**. Here's where things get a bit weird though. The smaller the f-stop value, the wider the aperture. Conversely, the bigger the f-stop value..... you've guessed it, the narrower the aperture.

There are very reasonable and logical mathematical reasons for this which I have no intention of going into here simply because I am really terrible at maths. I used to think multiplication tables were something you bought at IKEA.



f/16



f/11



f/8



f/5,6



f/4



f/2,8



f/2



f/1,4

Each value from left to right represents a **doubling of the amount of light** entering the lens for a given time the shutter stays open (shutter speed). If we go from right to left they represent a **halving of the light** for the given shutter speed. These are standard values used on all cameras.

You will often see other f-stop values in between the values shown on the above chart such as f3.5 and f10. These allow us to be even more precise in our choice of aperture and resulting depth of field which we will know look at.

What effect does our choice of aperture have on the look of our photograph?

The most obvious effect the aperture setting has on our photograph is the **depth of field**. In simple terms, this refers to how much of our final image is acceptably sharp.

In slightly more detailed terms it refers to the distance between the closest and farthest areas in a photo that appear acceptably sharp.

If you set a **wide aperture**, the **depth of field will be shallow**. This means that only part of your final photograph will be sharp and the rest will be blurred.

If you set a **narrow aperture**, the **depth of field will be deep**. This means that all of your photograph from the foreground to the background should be acceptably sharp.



Aperture: f22

This is very clear in the example above. When I used a **narrow aperture** of **f22**, the wine bottle and background are both sharp (**deep depth of field**).



Aperture: f1.8

When I switched to **wide aperture** of **f1.8**, the bottle is sharp but the background is now blurred (**shallow depth of field**).

In both photographs, I focused on the bottle itself. The difference resulting from using a different aperture each time is very striking.

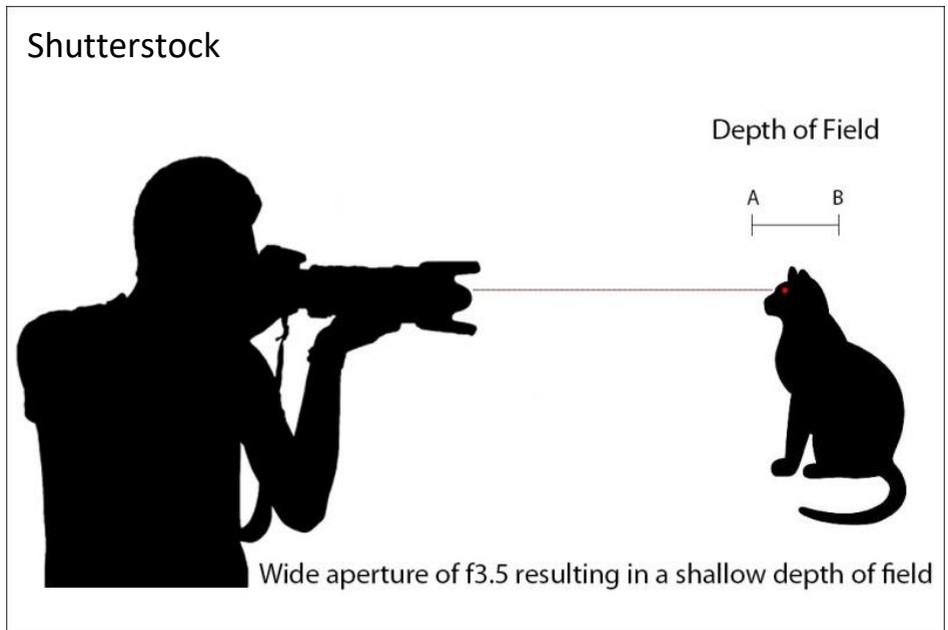
Both shallow and deep depths of field have their uses which we will look at a little later

Wide Aperture / Shallow Depth of Field



I set a set a **wide aperture of f3.5** when I took this photograph of this cat. I then focused on one of the cat's eyes. This resulted in the **cat being sharp** while **the background is out of focus** and blurred.

This can be a very useful technique when you want to separate your subject from your background. This is a technique that is frequently used by portrait photographers.



Take a look at the diagram above. You will see how I set a wide aperture of f3.5. I then focused on one of the cat's eyes. This resulted in a very shallow depth of field.

In this case, the depth of field extended from the tip of the cat's nose to the back of its head.

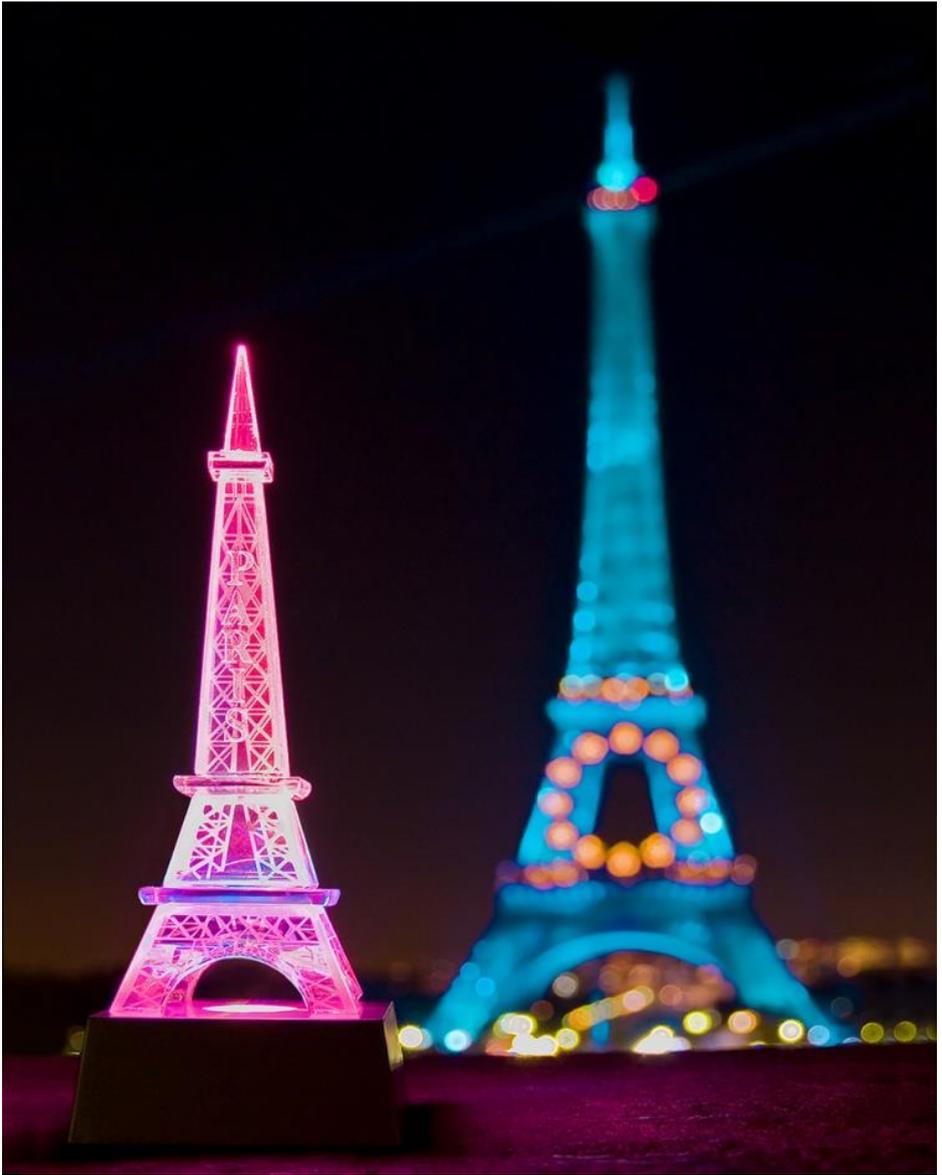
Anything in this zone is sharp. Anything in front or behind it (such as the leaves in the background) will be out of focus.

For very wide apertures such as f1.2, the depth of field may be no more than a few millimetres. This can make focusing very tricky especially if the subject (or photographer) is moving even slightly. A sturdy tripod and/or avoiding too much alcohol can be useful in this situation.

You might notice that there is about double the amount of depth of field behind the point of focus as in front of it. We will come back to this point shortly.

Although using a wide aperture to create a shallow depth of field is often used by portrait photographers, it can also be used creatively in other situations.

Here are some more examples of photographs I took using a wide aperture in order to create a shallow depth of field for creative effect.



The Eiffel Tower – Miniature and Real

For this shot, I bought a small (and very classy) souvenir Eiffel Tower that lit up in a tasteful pink neon glow.

I placed this on a wall and set up my camera and tripod. I set a fairly **wide aperture** of **f4** and focused on the souvenir Eiffel Tower.

This resulted in the mini tower being sharp while the real Eiffel Tower in the background is thrown out of focus and appears blurred.

The Eiffel Tower has been photographed millions of times so it can be difficult to try to find a new way to capture this iconic symbol of Paris.

This was a fun shot to create and now I have a very tasteful and elegant pink neon mini Eiffel Tower sitting in the centre of the mantelpiece.

My wife is less enthusiastic about it funnily enough. Apparently, it lowers the tone of the room and clashes with the décor. Pffft.



Flowers by a Romanian Farmhouse

I used a similar technique in this photo taken outside a Romanian farm house. I set a **wide aperture of f4** and focused on the yellow flowers.

The flowers closest to me where I set focus are sharp as a result and the farm house in the background is out of focus.

Flowers and plants are an excellent subject for shallow depth of field photography.

Narrow Aperture / Deep Depth of Field



Dublin Docklands

In this photo taken in the Dublin Docklands, I set a very **narrow aperture** of **f16**. This resulted in the entire scene from the dock cleat in the foreground to the elegant Samuel Beckett Bridge in the distance being acceptably sharp.

Narrow apertures are often used in landscape photography when we want the entire scene to be as sharp as possible.

In the cat photo, we focused on the eyes as this is the area we wanted to be most sharp. Where do we focus in a scene when we want everything to be sharp? The answer is about $\frac{1}{3}$ the way up from the bottom of the frame.

This is because (as I mentioned earlier), there is **twice as much depth of field behind the point of focus as in front of it**. Focusing a third the way up from the bottom of the frame maximises the depth of field. In the above photo, I focused where the red dot is.

In the photo on the next page taken in the beautiful medieval city of Bruges, I wanted both the bridge and the buildings in the background to be sharp.

A fairly **narrow aperture** setting of **f11** was enough to ensure that the entire scene was acceptably sharp. For this shot, I focused on the top of the bridge where the red dot is.



Groenerei Canal in Bruges

Mid-Range Apertures

We've now had a look at very wide apertures and very narrow apertures but what about the apertures that lie in the middle?

I often use these apertures when I'm shooting hand held for something like street photography in the daytime.

Aperture affects shutter speed and a mid-range aperture gives me enough depth of field combined with a fast enough shutter speed so that I don't blur the photos through **camera shake**.

I will discuss shutter speed and its relationship to aperture in more detail a little later in a later tutorial.

For now just know that **wide apertures** tend to result in **faster shutter speeds** and **narrow apertures** tend to result in **slower shutter speeds**.



Women by a Bridge in Venice

While walking around Venice during the day, I set an aperture of about **f8** for most shots like the one above. This allowed for fast shutter speeds and enough of depth of field to keep the entire photo acceptably sharp.

It should also be noted that it is at these mid-range apertures that lenses are often at their sharpest. When I want everything in a scene to be sharp, I try to use an aperture as close to these

mid-ranges as I can. Funnily enough, if you go too narrow with your aperture, your photos can actually become a little less sharp due to something called **lens diffraction**.

For this reason, I tend to avoid going narrower than f16 (or f22 at a push). You can see in the bridge photo from Bruges that f11 actually allowed for more than enough depth of field to ensure the whole scene was acceptably sharp.

I once accidentally set my aperture to an extremely narrow f32. I spent about half an hour taking photographs in the most beautiful morning light imaginable.

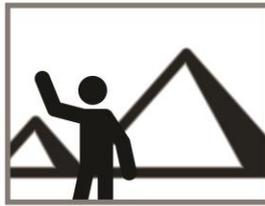
You can imagine my disappointment when I realised that none of the images were sharp enough to use due to lens diffraction.

Lesson learnt. Always double check your settings!

Adobe Stock



○ F22



○ F16



○ F11



○ F8



○ F5.6



○ F4



○ F2.8



○ F2



○ F1.4

The chart above gives a visual representation of how your choice of aperture will affect the depth of field in your photograph.

Notice how the narrower the aperture, the sharper the pyramid in the background is while the wider the aperture, the more blurred it is.