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Guide To Understanding Aperture



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Aperture Basics

- The aperture is the opening in the lens that lets light into the camera.
- The size of the aperture determines how much light is able to enter the camera.
- The size of the aperture is indicated by the Aperture number and can be changed in 1/3 stop increments on all cameras.
- The smaller the number, the larger the size of the aperture, which allows for more light to be gathered for the photo.

Choosing An Aperture While Shooting

Remember that the lower your Aperture setting is, the more light is able to pass through the lens.

When shooting, an easy way to remember this is to think of lightbulb wattage.*

- **When shooting in LOW wattage light, use a LOW Aperture setting.**
- **When shooting in HIGH wattage light, use a HIGH Aperture setting.**

**The aperture setting doesn't just help control how much light you capture for a photo, it also affects how your photo will look.*

What this means is that there are times where you're in high light, but you actually might want to use a low aperture. Not because of the exposure, but because of how you want the photo to look!

So this trick of low light, low aperture and high light, high aperture is not a rule, but a device to help you remember what those aperture numbers mean!

Understanding Aperture

Aperture, is an opening in the lens that allows us to control how much light we capture when taking a photo.

The size of that opening can be changed through the Aperture setting, and it's being able to change the size of the aperture that allows us to control how much light comes into the camera.

You can see it here. The larger the opening is, the more light is able to enter the camera. When the opening is smaller, less light is able to enter the camera.



The numbers you see for the Aperture setting indicate how large the aperture opening is.

On this Aperture scale, the bold numbers indicate full stops. The in between numbers are the 1/3 stop increments.

1.4 1.6 1.8 **2** 2.2 2.5 **2.8** 3.2 3.5 **4** 4.5 5 **5.6**
6.3 7.1 **8** 9 10 **11** 13 14 **16** 18 20 **22** 25 29 **32**

When you see the Aperture number on your camera it may have an "f" in front of it.

Whether there's an "f" or not, this number indicates the size of the aperture.

Now the reason the Aperture setting is so confusing is because of what the numbers mean, and the numbers are essentially backwards.

With your Aperture setting, the lower the number, the more light you will get.

If you are taking notes, write this down:

The lower the Aperture number, the more light you will get.

If we're looking at the Aperture scale that means that an Aperture of f3.5 lets in MORE light than an Aperture of f9. This seems stupid but it is the way it is because of how the Aperture number is calculated.

The Aperture number is calculated by taking the focal length of the lens and dividing it by the diameter of the aperture.

For instance, if we take a lens with a focal length of 50mm, when the aperture of this lens is open so that the diameter is 25mm, the Aperture number is 2 or f2.

50 divided by 25 is equal to two, giving an Aperture of f2.

$$\text{f-number} = \frac{\text{focal length}}{\text{aperture diameter}}$$

$$\text{f-number} = \frac{50}{25} = 2$$

$$\text{f-number} = \frac{\text{focal length}}{\text{aperture diameter}}$$

$$\text{f-number} = \frac{50}{12.5} = 4$$

If we take the Aperture and make it smaller so that the diameter is 12.5mm, we get f4. 50 divided by 12.5 is equal to four, giving us f4.

This is why larger Aperture numbers indicate smaller aperture openings and smaller Aperture numbers indicate larger aperture openings.

This little bit of math makes the numbers work the reverse of what we'd expect. Logically it would make sense that a larger Aperture number would indicate a larger aperture opening.

Instead, because of the math, as the diameter gets smaller, the number gets bigger.

What we've seen here is how the Aperture number changes based on the size of the aperture itself and how a lower number means you will capture more light.

In these previous examples, I was using a 50mm prime lens which is a lens that does not zoom. However many of us have zoom lenses on our cameras. The 18-55mm kit lens that comes with DSLRs is very common. So is the 18-105mm lens, the 55-300mm zoom, and a variety of other zoom lenses.

Somewhere on that zoom lens, there is some information about your aperture.



On this 18-55mm kit lens, it's printed on the front of the lens. The information we're looking for is where it says "1:3.5 - 5.6".

The numbers after the colon, "3.5 - 5.6", are Aperture numbers. They indicate the largest available Aperture range for this lens.

All zoom lenses have a variable maximum Aperture. By maximum Aperture, I mean the largest opening (which would be the lowest Aperture number).

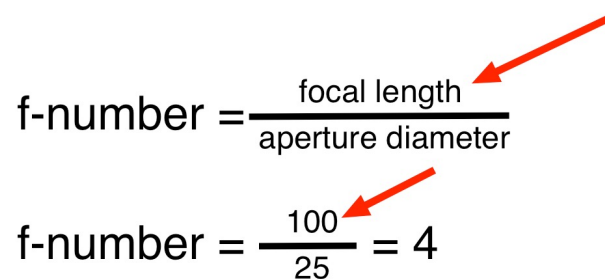
The reason this number is variable is because this is a zoom lens.

If the formula for calculating the Aperture is the focal length divided by the diameter of the aperture, then when we change the focal length, this will change the resulting Aperture number. Just like it changed when we changed the diameter of the aperture.

Here's the math again. We already know that with a focal length of 50mm and an aperture diameter of 25mm we get f2.

Now let's change the focal length of the lens. If we change the focal length to 100mm, we now get f4.

100 divided by 25 is 4, giving us f4.


$$\text{f-number} = \frac{\text{focal length}}{\text{aperture diameter}}$$
$$\text{f-number} = \frac{100}{25} = 4$$

This is something important to understand. When you zoom your lens, the Aperture changes. This impacts the amount of light you are letting into the camera for your photo.

Let me show you what I mean.

If you have a zoom lens, grab your camera and put that zoom lens on the camera if it isn't already. Turn on the camera, make sure it's in Manual mode, take off the lens cap, and start by zooming your lens to the widest focal length.

With the lens zoomed to the widest focal length, press your shutter button halfway down to wake up the camera and then set your Aperture to the smallest Aperture number (which corresponds to the largest possible size opening for that lens).

Jot down that number. If it's a kit lens, the number is likely f3.5.

Now zoom the lens all the way to the narrowest focal length.

Press your shutter button halfway down to make sure the camera is awake and then look at your Aperture number.

Did it change?

If you have an kit lens, it should have, and it most likely changed to f5.6

It changed because the variables in the formula changed. That change has a real impact on the photos you take.

I want to stress this point. **This change in Aperture is real.** We know that smaller Aperture numbers indicate that less light is able to pass through the lens for the photo.

So when you zoom your lens to 55mm and the Aperture automatically changes from f3.5 to f5.6, you get less light. Specifically 11/3 stops less light.

Now, one more thing about zoom lenses.

There are zoom lenses that maintain a constant maximum Aperture throughout the zoom range.

These are generally more expensive and higher quality lenses. An example is this Pentax 16-50mm lens.



It's printed on the barrel instead of the front, but you can see that the Aperture is listed as 2.8.

That 2.8 indicates that the largest Aperture size available throughout the entire zoom range is f2.8. That means that whether I'm zoomed to 16mm or the full 50mm, I can still set my Aperture to f2.8.

Having a lens like this is a HUGE advantage, and if you can afford to get yourself one I'd highly recommend it.

Conclusion

I am excited to help you in your your photography journey, and I am really looking forward to seeing what you can do with your camera, but using your camera for amazing photos is much more than just understanding your Aperture setting, so if you want to truly master your camera and use it to take amazing photos that will match the vision you see in your mind, check out my [Guide to Shooting in Manual Mode](#).

The Guide expands upon what we've covered in this book, and much more, including:

- How cameras work, including more in depth explanations of ISO, Aperture, and Shutter Speed
- Exactly how to change your ISO, Aperture, and Shutter Speed settings
- An in depth look at exactly how changing ISO, Aperture, and Shutter Speed will change your photos
- Exactly how to get Shallow Depth of Field when you want it
- The secret to my I Am Shooting method, which will help you choose the right settings for the photo you want to take every single time
- How to take sharp photos and avoid those crappy blurry photos we never want to take
- and much more...

[Go check it out](#), and then...

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