

Lighting Ratios

The dictionary definition states, “the quantitative relation between two amounts showing the number of times one value contains or is contained within the other”.

In respect to lighting ratios, you measure the light falling on the light or highlight side of the face, and compare it to the shadow side to arrive at the lighting ratio. How exactly do you do that? While you can do it with the built-in meter in your camera, (set to spot meter for more accuracy) it is much easier and more accurate to use a handheld incident light meter.

Your in-camera meter is a reflective style meter which takes a measurement of the light reflecting OFF of your subject. A handheld meter is an incident meter (although it can be both with an attachment) which measures the amount of light falling ON the subject and is a more accurate way of measuring lighting ratios.

Key Concepts

To properly measure and understand ratios in respect to photography, you need to understand a few things. First that light is measured in photography terms by f-stops. The aperture dial or setting on your camera goes up in 1/3 of a stop increments (or ½ stop if that’s how you’ve set your custom settings). The full stops for aperture are: f1, f1.4, f2, f2.8, f4, f5.6, f8, f11, f16, f22, f32, etc. A simple way to remember all those numbers is just to remember 1 and 1.4, and all of the other pairs are doubled from these (next pair is 2 and 2.8), with a few rounded off.

We also need to understand that the shutter speeds are also representative of “stops”, with the full stops being at: 1 sec, ½ sec, ¼, sec, 1/8th, 1/15th, 1/30th, 1/60th, 1/125th, 1/250th, 1/500th, 1/1000th, etc. These are easier to remember as they are generally doubled (with a couple round offs 1/8th to 1/15th).

The key concept you need to understand is that each full stop is double (or ½, depending which direction you go on the scale) the amount of light over the previous one. For example: if you are shooting at f4 and want to shoot at f5.6, you will need to double the amount of light to get one more stop. If you want a 2-stop difference then we’re talking about 2x2 or 4 times more light. Likewise, 3 stops is 2x2x2, or 8 times more light and so on.

Common Lighting Ratios		
Ratio	Stops Difference	Description
1:1	0 Stops	Flat Lighting
2:1	1 Stop	General Colour Photography
3:1	1 ½ Stops	General Black & White Photography
4:1	2 Stops	Dramatic Lighting, Low Key
8:1	4 Stops	Very Dramatic, Low Key

Ratios				Ratios			
		Main	Fill			Main	Fill
1:1	0 Stops	F2.8	F2.8	1:1	0 Stops	F4	F4
2:1	1 Stop	F4	F2.8	2:1	1 Stop	F5.6	F4
2.5:1	1 1/3 Stops	F4.5	F2.8	2.5:1	1 1/3 Stops	F6.3	F4
3:1	1 ½ Stops	F4.8	F2.8	3:1	1 ½ Stops	F6.7	F4
4:1	2 Stops	F5.6	F2.8	4:1	2 Stops	F8	F4
8:1	4 Stops	F11	F2.8	8:1	4 Stops	F16	F4

Ratios				Ratios			
		Main	Fill			Main	Fill
1:1	0 Stops	F5.6	F5.6	1:1	0 Stops	F8	F8
2:1	1 Stop	F8	F5.6	2:1	1 Stop	F11	F8
3:1	1 ½ Stops	F9.5	F5.6	3:1	1 ½ Stops	F13	F8
4:1	2 Stops	F11	F5.6	4:1	2 Stops	F16	F8
8:1	4 Stops	F22	F5.6	8:1	4 Stops	F32	F8

1:1 Ratio



A 1:1 ratio is even lighting, it has no ratio, and there is no difference in meter reading from one side of the face to the other. This is very flat lighting, which can be achieved a couple of different ways. First, you can use a fill flash and make the flash equal to the main light source or window light. This is harder to achieve until you've had some practice, and often you'll end up overpowering the natural light with flash. Secondly, you could use a reflector. It will need to be really close to the subject so that you cannot see any shadows on the subject's face any more. This is a 1:1 ratio and is pretty easy to see and recognize visually.

2:1 Ratio



As the numbers suggest, this is a ratio where one side is twice as powerful as the other.

So, knowing that and what we know about f-stops we can set up this lighting ratio.

NOTE: these f-stops, or apertures, I'm mentioning here are for metering purposes, that is not what you will set your lens at for the exposure. Meter how you usually do to determine the correct shooting exposure. Take a test shot, review the histogram, and adjust it accordingly.

Put your subject into the light, where you are going to photograph them. Using a light meter, measure the light falling on the side of their face closest to the light source (called the highlight side). Let's say that measures f8. (Keep your shutter speed the same for both measurements for consistency.)

Then bring in your reflector and using the light meter again, measure the light falling on the side of the subject's face that is further away from the light source (from here on in, this will be referred to as the shadow side).

Note: If you are using a handheld meter, make sure to shield the meter from getting light from the opposite direction falling on it as you make your readings. EI: if you are metering the shadow side nearest the reflector, shield the meter so the main light source isn't hitting it.

You may have to adjust the reflector distance to subject until the reading measures f5.6 which is ONE STOP, or ½ the amount of light as f8 on the other side. Notice the reading tells us to use a larger aperture (f5.6) which means there is less light. This will give you a 2:1 ratio. Study the image above and recognize the contrast range from highlight to shadow sides on the face. It's subtle but you can see it now.

4:1 Ratio



A 4:1 ratio is double the last one. So, if 2:1 was twice as much light, or one stop – how much will 4:1 be? 2×2 , 4 times as much light, or a 2-stop difference from highlight side to the shadow side of the face.

I teach an available light class and I always recommend working with natural light before you advance on to studio lights, and especially to using speedlights. With available or natural light, and a reflector, it is MUCH easier to learn and practice lighting because you can SEE what happens as you make changes (WYSIWYG). Flash is harder to predict, as you can't see it without actually taking a photograph.

So, if our main light (the window) is still at f8 – what does our fill light or the shadow side need to be to achieve a 4:1 ratio? Let's do the steps again: $f8 > f5.6 > f4$.

Therefore, two stops less than f8 is f4 and the desired measurement to create a 4:1 ratio. Look again at the photo above and see how the shadow side is getting darker each time?

8:1 Ratio



The last ratio we'll look at is 8:1. This is 8 times as much light, (you can see that in the ratio "8 to 1"), or 3 stops, from one side of the face to the other. It is quite dramatic and anything greater than 8:1 will not hold much detail on the shadow side at all. Prints have a maximum contrast range of 4-6 stops. So, unless you want: one side of the face pure white; the shadows pure black; and no mid tones in between; I suggest keeping it to an 8:1 or lower ratio.

This one can be a bit tough to create. You may need a bit harsher lighting and possibly a black reflector to add blacks into the shadow side (rather than reflecting light into it). As before we calculate it the same way. If 4:1 is 4 times the light – 8:1 will be 8 times the light – or 3 stops. So if we are still at f8 on our

highlight side, we need to get our shadow side to read: $f8 > f5.6 > f4 > f2.8$. So our fill must read f2.8 to get an 8:1 ratio. Notice how deep the shadows are in the 8:1 image above? It's more dramatic than the others.



How to use Ratios

Okay now that we have all this knowledge of ratios, let's put it to use! As I mentioned at the beginning of this article, the ratio can add to the success of your portrait or can ruin it. If you look at the 4 example images again, take a look at how the mood of the image changes with the ratio. Notice how the higher ratios have more drama, more power in sense. Notice how the lower ones are softer and seemingly more innocent.

Generally, somewhere between 2:1 and 4:1 is the commonly used ratio for most portraiture. It's enough to create modelling on the face, but not too much to create unattractive deep shadows. I personally like about 3:1 (1 and a half stops) or 4:1 myself.

For a child or baby most often you want a lower ratio, one that is softer to go with the subject matter. But, put a grizzled old cowboy with weather wrinkled skin, and unkempt whiskers in front of your camera and what ratio do you think is best for such a fellow? If you said 4:1 or 8:1 I'd agree. He's rougher, tougher and can handle the increased contrast as it is suitable for his look.

If you have difficulties because you do not have a hand-held meter, don't worry about going out and buying one. I'd only suggest that if you plan on getting into studio lighting. Instead just practice seeing the difference between the various ratios (why I suggest natural light), and if they aren't a perfect 4:1 or 8:1 or whatever it doesn't matter. Just learn to recognize when it's too strong and when it's too weak for the affect you want to create.

