

GUIDE NUMBERS

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Today's cameras have so many bells and whistles on them, that taking pictures is quite a simple proposition for the most part. However, there are times when more control over your photography is needed. Taking pictures in the daytime is usually not a problem, but manually setting your camera and flash during low-light situations is an entirely different situation. This is when we run into that ugly term: "Guide Number." What is a guide number and how do you use it to obtain properly exposed photographs?

The guide number is a value offered by manufacturers that indicates a flash unit's power. The guide number is equal to the camera's aperture setting multiplied by the subject distance ($GN = \text{Subject Distance} \times f/\text{stop}$). The guide number will be listed in feet or meters and is usually set for a film speed of 100. Knowing your flash's guide number will allow you to manually calculate the proper relationship between subject distance and aperture settings in order to properly illuminate the subject. Other ways of writing this formula include:

$$\text{Subject Distance} = GN / \text{Aperture}$$

$$\text{Aperture} = GN / \text{Subject Distance}$$

For example, your flash has a guide number of 120 and your subject is 15 feet away from your flash. 120 (GN) divided by 15 (Subject Distance) equals 8 (Aperture). Therefore, the proper camera's aperture setting for this situation would be $f/8$. **Notice that when you are determining the subject distance, it will be the distance between the flash and the subject, not the camera and the subject.**

This calculation can also be done another way. Using the same flash with a GN of 120, you have decided to shoot a portrait with an aperture of $f/4$. 120 divided by 4 equals 30. Therefore your subject distance must be 30 feet away from your flash. Notice that the values we are

working with are aperture and subject distance, but we are not changing the shutter speed. The shutter speed value does not affect the guide number value. However, remember to keep your shutter speed settings at or below (slower) than your camera's synchronization speed. Failure to do this will cause your images to come out only partially exposed. In addition, setting your camera's shutter speed to a slower shutter speed than the maximum synchronization speed will tend to create more light-balanced photographs.

Setting your flash so far away from the subject can be inconvenient, therefore many flashes come with variable power settings. This is helpful when you wish to keep the aperture and subject distance constant. Let's say we are using our same flash with a guide number of 120, but wish to shoot a subject from 10 feet away and at an aperture of $f/5.6$. 5.6 multiplied by 10 equals 56. 56 is roughly one-half of 120 and if your flash allows you to reduce the maximum power of your flash by $\frac{1}{2}$, then you would be able to keep your 5.6 aperture at 10 feet. When purchasing a flash for your camera, I would recommend not only a flash with a high guide number, but one that has variable power settings.

One thing to keep in mind is that the guide number is just that, a guide. Even if the manufacturer does not inflate the guide number's value for selling purposes, the numbers are usually determined by testing the flash in an enclosed environment with white (reflective) walls and ceilings. Therefore it would probably be safe to calculate your settings when shooting indoor subjects, but your photographs may be severely underexposed if taken outdoors. I have found that the difference between an indoor and an outdoor guide number value can be as much as two f/stops for the same flash unit.

As we know, higher speed films have more light sensitivity and you may want to use a 400 or 800 ISO speed film when taking photographs. The easiest way to adjust the guide number for different film speeds is to

add an additional value to our earlier formula:

Guide Number = Subject Distance x Aperture x Sensitivity Factor

<u>Film Speed</u>	<u>Sensitivity Factor</u>
50	.71
100	1.0
200	1.4
400	2.0
800	2.8
1600	4.0

The result of this formula will give you a guide number value for different film speeds. Notice that the sensitivity factor is equal to the steps on an aperture ring.

There is a way to determine a more accurate guide number for your current flash. First, load your camera with 100-speed slide film. Slide film has much less latitude for exposure than print film, so it is a better choice for testing your equipment. Set up your camera and flash 10 feet away from any subject. Include with your subject a series of placards with a printed range of aperture settings: 2.8 – 4.0 – 5.6 – 8.0 – 11 – 16. You can include half f/stops if you wish to obtain a more precise value. Now, take a series of photographs using the flash's full power and the constant 10-foot subject distance. Each photograph will be taken with a different aperture. Change the aperture setting on your camera to match the placard that will be shown in the picture. When the slides are developed, you can examine each one and find out which exposure was best. Let's say after examining all the slides we find that an aperture of f/8 created the best exposure. This would mean that your flash would have a guide number of 80 (f/8 x 10 feet). Now you can use this number to accurately set your flash for all situations.

Although TTL (Through-The-Lens) metering makes calculating exposures unnecessary, shooting manually can produce photographs that are of greater evidentiary value, as well as being more engaging. In some situations the use of multiple flashes in order to supplement the ambient light available can provide for additional information being properly recorded in the image which otherwise may have been lost. The manual calculations for flash exposures can be used for special lighting techniques such as Painting With Light, Fill-Flash Lighting, and Multiple-Flash Lighting. All of these techniques strive to enhance the ambient lighting in a way to create a more balanced and well-illuminated subject. (These techniques will be elaborated on in future articles).

With today's TTL metering systems and automatic cameras, most photographers do not ever worry about having to use their flash in a manual mode. However, there are times when that information may come in handy. So pull out that old instruction manual on your flash and check your guide number values. Test your ability to obtain a proper flash exposure without all the convenient bells and whistles that your camera has and shoot with confidence.

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**The CBD-IAI Fall Conference
will be held
November 5 and 6
at the
Clarion Resort Fontainebleau Hotel
10100 Coastal Highway
Ocean City, MD**

Room rates will be \$84 plus tax per night