

ZONE SYSTEM / BRACKETING

III

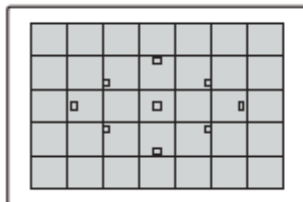
ZONE SYSTEM / BRACKETING

Taking a picture is, at the simplest level, a question of manipulating three variables; **composition** (what you see in the viewfinder and thus capture), **focus**, and **exposure**.

The exposure setting can be viewed as a combination of two settings, **metering mode** and **exposure mode**.

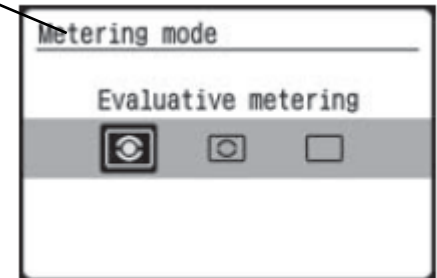
Metering mode determines where/how the camera's meter reads the light in a given scene.

Matrix mode, where the camera reads the light in a number of "zones" of the image and compares these zone readings to a database of "good" exposures to determine how to set the exposure. Matrix metering is good for from-the-hip shots where you don't have much time to fiddle with things.



Evaluative metering

This is an all-around metering mode suited for portraits and even backlit subjects. The camera sets the exposure automatically to suit the scene.



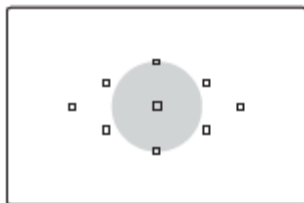
Center-weighted mode, where the exposure is taken from a weighted average of the center-of-the-view subject and a graduated area radiating out from that point. This mode is helpful when you're taking a picture of something specific and want that something to be the primary determinant in the exposure, but where surrounding stuff will also have to be considered at a slightly lower priority.



Center-weighted average metering

This is for advanced users for obtaining the correct exposure for backlit subjects and other scenes using appropriate exposure compensation.

Spot metering mode where the exposure is calculated from a single very small point at the center of the viewfinder area, usually a couple of degrees. This mode is essential when you are trying to be sure that a very specific thing is exposed correctly no matter what happens in the rest of the scene. It's also the basis for metering for "semi-manual" exposure setting, a topic we're going to get to in a minute.



Partial metering

This is effective for backlit subjects when the light surrounding the subject is strong. The gray area in the left figure is where the metering is weighted to obtain the standard exposure.

In [photography](#), **bracketing** is the general technique of taking several shots of the same subject using different or the same camera settings.

Bracketing is useful and often recommended in situations that make it difficult to obtain a satisfactory image with a single shot, especially when a small variation in [exposure](#) parameters has a comparatively large effect on the resulting image. [Autobracketing](#) is automatic bracketing by using a setting on the camera to take several bracketed shots (in contrast to the photographer altering the settings by hand between each shot).

Contents

[hide]

[1 Types of bracketing](#)

[1.1 Exposure bracketing](#)

[1.2 Focus bracketing](#)

[1.3 White balance bracketing](#)

[1.4 Flash bracketing](#)

[2 References](#)

http://en.wikipedia.org/wiki/Exposure_bracket

Exposure is set by a combination of lens opening (aperture) and shutter speed

The exposure modes determine how the camera will balance these two variables:

Programmed exposure mode means that the camera will set both shutter speed and lens opening for you based on a table that will be found in the manual.

Shutter priority mode lets you set a shutter speed and the camera will calculate the lens opening based on the meter reading. This mode is great either to stop action or to eliminate shake effects with long telephoto lenses.

Aperture priority mode lets you set a lens opening and the camera will pick the shutter speed for specific depth of field.





wide aperture / quick shutter speed

Underexpose and sacrifice shadow detail to retain highlight detail.



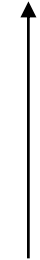
photo.net/bboard-uploads/007Sth-16715784.jpg

Small aperture / longer time

Overexpose and sacrifice highlight detail to retain shadow detail.



Interactive

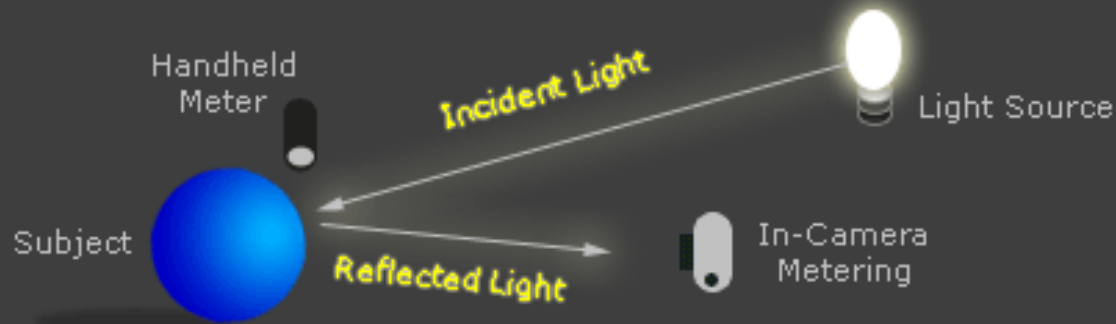


<http://www.olympusmicro.com/primer/java/photomicrography/correction/index.html>

www.projectorreviews.com/.../imagequality.php

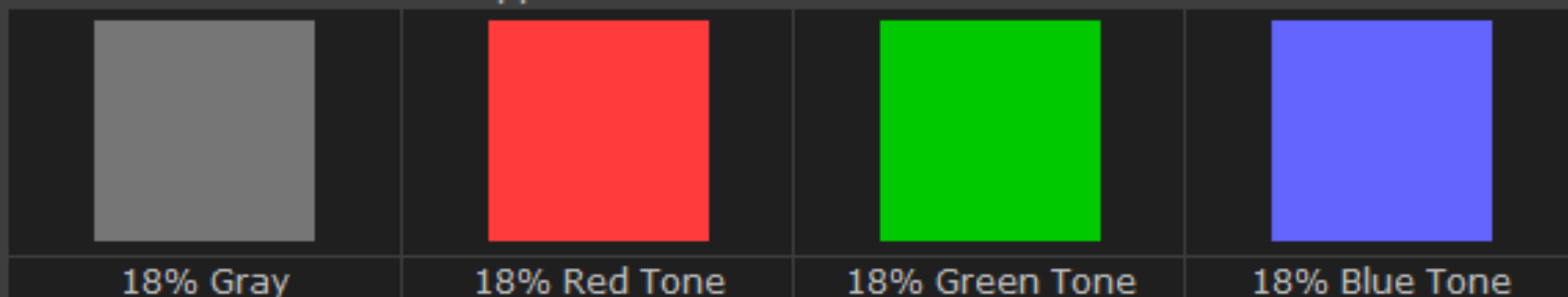
BACKGROUND: INCIDENT vs. REFLECTED LIGHT

All in-camera light meters have a fundamental flaw: they can only measure reflected light. This means the best they can do is guess how much light is actually hitting the subject.



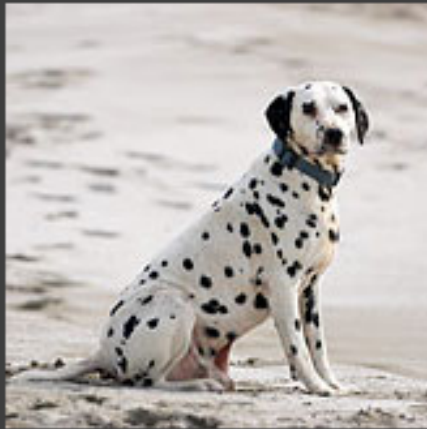
If all objects reflected the same percentage of incident light, this would work just fine. However, real-world subjects vary greatly in their reflectance. For this reason, in-camera metering is standardized based on the luminance of light which would be reflected from an object appearing as middle gray. If the camera is aimed directly at any object lighter or darker than middle gray, the camera's light meter will incorrectly calculate under or over-exposure, respectively. A hand-held light meter would calculate the same exposure for any object under the same incident lighting.

Approximations* of 18% Luminance:



*Most accurate when using a PC display which closely mimics the sRGB color space.

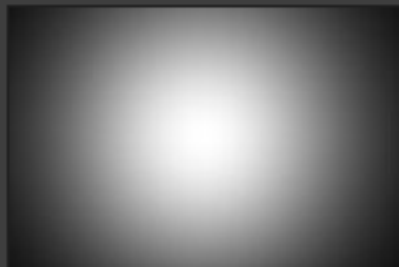
What constitutes *middle gray*? In the printing industry it is standardized as the ink density which reflects 18% of incident light, however cameras seldom adhere to this. This topic deserves a discussion of its own, but for the purposes of this tutorial simply know that each camera has a default somewhere in the middle gray tones (~10-18% reflectance). Metering off of a subject which reflects more or less light than this may cause your camera's metering algorithm to go awry-- either through under or over-exposure, respectively.



An in-camera light meter can work surprisingly well if object reflectance is sufficiently diverse throughout the photo. In other words, if there is an even spread varying from dark to light objects, then the average reflectance will remain roughly middle gray. Unfortunately, some scenes may have a significant imbalance in subject reflectivity, such as a photo of a white dove in the snow, or of a black dog sitting on a pile of charcoal. For such cases the camera may try to create an image with a histogram whose primary peak is in the midtones, even though it should have instead produced this peak in the highlights or shadows (see high and low-key histograms).

METERING OPTIONS

In order to accurately expose a greater range of subject lighting and reflectance combinations, most cameras feature several metering options. Each option works by assigning a weighting to different light regions; those with a higher weighting are considered more reliable, and thus contribute more to the final exposure calculation.



Center-Weighted



Partial Metering



Spot Metering

But What's the Right Exposure?

When you meter something, the camera's exposure system assumes that the "subject" is of average tone—not white snow or a black jersey. It attempts to render that subject as "average" exposure.

There's a technique from the old days of film that will help. It's called the "Zone System".

Let's imagine a scale of ten zones. The extreme bottom of the scale is pure featureless black (Zone 0) and the top zone is featureless white (Zone 10)

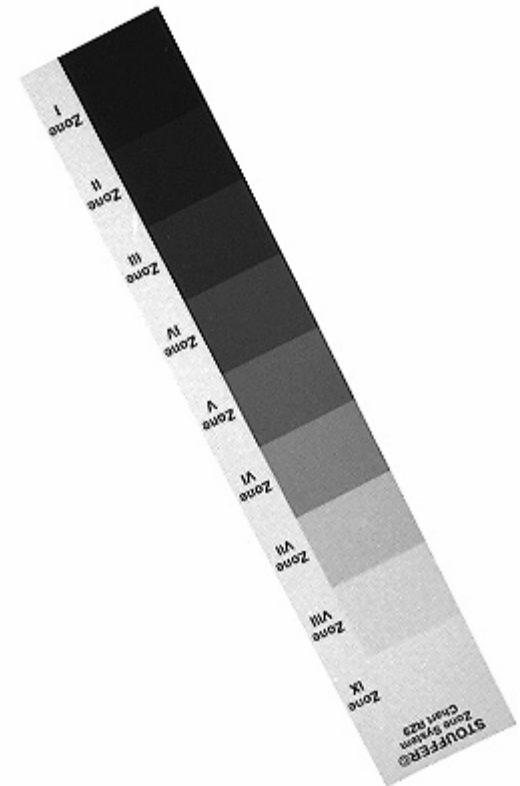
The zones in the scale are all separated by one "stop" of exposure, the difference between f5.6 and f8 at constant shutter speed, between 1/125th and 1/250th second with constant aperture.

On this scale, Zone 5 is the "average" we were talking about. Think of this as what grass might be properly exposed at if it were shot on a hazy day with no distinct shadows.

Technically, it's the exposure you'd give an 18% gray card to get it to look 18% gray in the output print.

Here are the zones in the system:

- **Zone 0 is featureless, pure black.**
- Zone 1 is below the normal underexposure limit; will likely print black on most paper.
- Zone 2 is the darkest zone that will show any detail—the deep shadow zone of your images.
- Zone 3 will show distinct detail and texture.
- Zone 4 is the “faces in shadows” zone.
- **Zone 5 is normal exposure of a neutral (18% gray) object**
- Zone 6 is the “brighter” zone, faces in brighter light or snow/sand in shadow go here.
- Zone 7 is the bright zone, the lightest zone that will reproduce detail/texture.
- Zone 8 is the highlight zone, where some gross detail may be visible but most is lost.
- Zone 9 shows only minor variations in exposure, not enough to hold detail or texture; prints white.
- **Zone 10 is pure white.**



Zoning on the Average

If you have a “subject” in the picture, and if that subject is of normal tone (grass, our 18% gray card), you spot meter on that subject.

The camera will expose for Zone 5 when you spot meter.

To do that:

Remember your “base” exposure setting from the subject.

Move your spot meter to the brightest area of the image where you expect to hold any detail at all. This should give you an exposure of about two stops less (if you were at 1/500th at f8, you might now be 1/2000th at f8). If there is more of a difference than that, you’re going to blow out your highlights.

Move your spot meter to the darkest area of the image where you expect shadow detail. This should give you an exposure of about three stops more (1/60th at f8 in our example). If it shows a larger difference, you’re going to have opaque shadows.

If you see that you’re going to blow out something on the highlight or shadow end, you can try to shift your “average” setting in the direction of the problem (darker if your shadows are shot, and vice versa) by a maximum of one zone, or you can try to deal with it via our dynamic range tip.

Zone to the Max

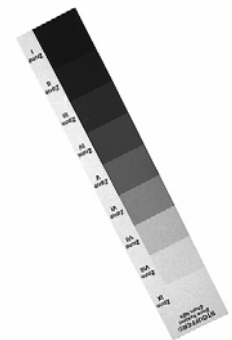
Another approach to using the zone system is to pick the lightest area you want to hold detail on as your target.

Here's the process:

Select the lightest area where you expect to hold detail at all (snow, if you want the texture, for example). Meter on this in spot mode. Remember, the camera will put this in Zone 5, so you want to move it up to Zone 7, meaning you'll now increase your exposure by two stops (either by dialing in compensation or using manual exposure and dialing in an overexposure of two stops—latter is easier).

If you have time, check the average/dark object areas to make sure they're around where you want them (Zones 5 and 2, respectively).

This technique is good for shots in snow, on sand/water, etc.



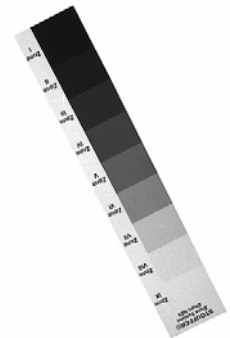
Zone as Low as You Go

The final technique is to pick the darkest **area where you want to hold shadow detail and measure on it.**

Remember, the meter will put it in Zone 5, so you will now want to underexpose three stops to push it down to Zone 2.

This technique is good for sunrise/sunset/moon pictures, because the natural behavior of camera metering would be to expose all pictures as though there was full daylight (matrix metering tricks this to a degree, which is why you shouldn't use zone exposure techniques except with spot metering).

Pick an area you want to be dark (deep shadow, pure black), meter on it, slip it down to the right zone (1 or 2) by underexposing the indicated number of stops, and you're done!



Aperture / shutter

Do not
compensate
and expose for
the midtones
and sacrifice both
highlight detail
and shadow
detail.

