External Exposure Meters Still as Important as Ever

One of the most frequently asked questions is: *"Is a handheld exposure meter still necessary at all for digital photography? My camera is capable of matrix metering, center-weighted metering and spot metering – what more could I possibly need? I see the image results immediately at my display and in the histogram, and I correct exposure there. If necessary, I get rid of any image recording flaws later at my PC with image processing software. Why should I work with a museum piece like the one my grandfather used?"*

In order to answer this question, we first have to look at what differentiates digital photography from analog photography. Basically, the only thing that has changed is the recording medium – an image sensor is used instead of film. Up to the point in time at which the image is actually recorded, everything's the same, and the same composition rules and optical laws apply to both analog and digital photography. Photography doesn't become digital until the data from the sensor are converted by means of an analog-digital converter.

And the curse or the blessing of this new technology begins no later than precisely at this time. In the case of analog photography, each recording costs real money for film and developing, in addition to which the results don't usually become visible until a week later. This necessitates well planned image composition, deliberate and careful work, and a limited number of recordings due to the costs involved. In the case of digital photography, a recording is assumed to have no costs at all, and it's available immediately. However, these positive aspects often lead to a careless attitude and an overwhelming inundation of images.

In the case of analog photography, flawed images can be corrected to some extent in the lab. This applies to digital photography too, except that a computer with image processing software is used. The same specialized knowledge and the same amount of time and effort are required in order to correct flaws which occur during image recording. However, correction options for achieving good results with a poor recording are limited. Neither ingenious laboratory techniques nor brilliant computer skills are capable of saving an image without any detail at the boundary areas between light and shadow.
The diverse exposure options and extensive information provided by modern camera systems would appear to make external exposure meters superfluous. However, closer examination reveals that this information is only conditionally meaningful for an evaluation of correct exposure.

Integrated exposure meters are limited.

Modern analog and digital cameras always function in accordance with the reflected light metering method, i.e. they measure the light reflected by the subject through the lens, and usually provide several reliable and accurate ways of setting exposure. And thus segmented or matrix metering, center-weighted metering and spot metering come to grips with many of the exposure problems encountered in practical photography, but by far not all of them!

Camera displays are not calibrated.

Visual checking of the exposure setting at a camera display which is not calibrated for brightness and color is only capable of revealing gross exposure errors, even if the display is well adjusted. Outdoors in the sunlight, exposure becomes a game of chance. The image frequently has an entirely different appearance in a calibrated monitor.

Histograms only show the distribution of tonal values throughout the entire image.

The histogram merely depicts the distribution of tonal values throughout the entire image and must be interpreted depending upon the subject, as well as lighting. The photographer needs lots of practice and experience to this end. Only in rare cases does the subject to be evaluated fill out the entire image area, which means that the histogram doesn't say anything about the evaluation of the subject or the segment.

Subsequent exposure corrections are greatly limited and time consuming.

Subsequent correction options available at the computer are time consuming, are incapable of replacing missing detail in highlighted areas and shadows, and represent a direct contradiction to the dynamic workflow associated with digital photography. Post-processing is always equated with the removal of information. If a tonal range which is too small is expanded, information gaps always occur which appear in the histogram as the dreaded "picket fence".

Handheld Exposure Meter as a Sensible Supplement to an Integrated Exposure Meter

Precise, repeatable exposure plays a significant role, and may not be left to chance. Exposure meters which are integrated into the camera function in accordance with the reflected light metering method and only show the correct exposure value if the subject itself reflects 18% of the incident light (gray chart). Handheld exposure meters which also use this metering method are subject to the same limitations, but they offer additional functions as image composition tools which go well above and beyond the possibilities of integrated metering systems. These include precise incident light measurement with spherical or flat diffuser, flash measurement with evaluation of the incident light ratio, differentiated contrast measurement and mean value generation, as well as spot metering independent of focal length and measurement and evaluation in accordance with the zone system.

Better Results with the Incident Light Metering Method

Handheld exposure meters make use of the incident light metering method, i.e. they measure the light which strikes the subject and calculate a more precise exposure independent of the subject's color and reflectivity. This is especially advantageous for primarily bright or dark subjects. In the case of exposure meters with flat diffusers, the otherwise spherical acceptance angle (180°) can be adjusted to a more directional measurement.

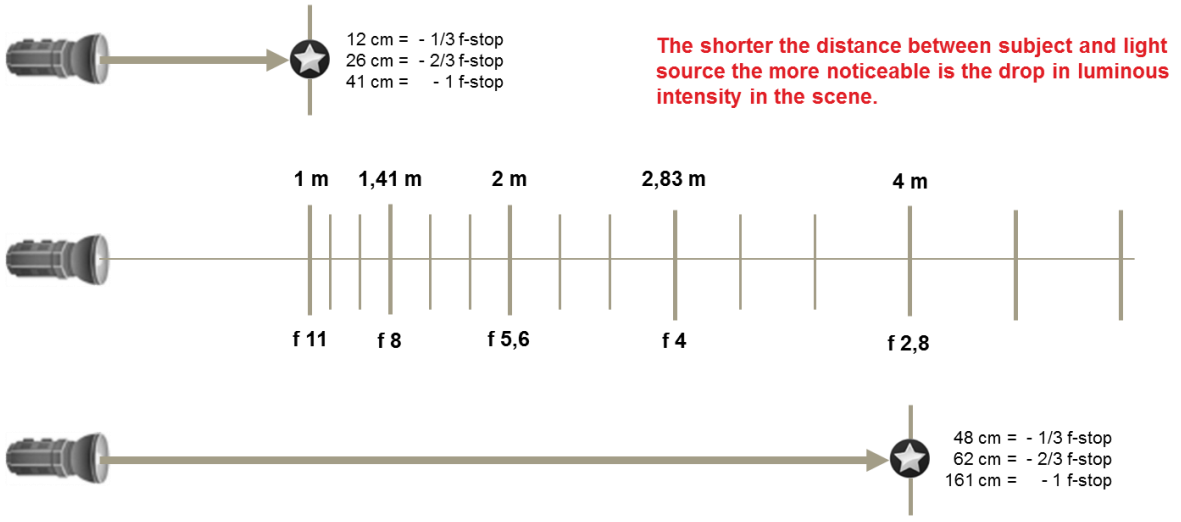
Reflected Light Metering - Camera

Incident Light Metering – Handheld Exposure Meter

The example white car on white background and black car on black background shows in the pictures above the results of camera internal reflected light metering and handheld exposure meter incident light metering. The camera interprets in both scenes the brightness as neutral gray tone (18% reflection) and exposures wrong because the scenes differ extremely from the neutral gray tone.

Measurement of Drop in Luminous Intensity

Within a spatially distributed subject, the intensity of the light decreases by the square of the distance to the main light source. The closer the main light source is to the subject, the more noticeable is the drop in luminous intensity. With the incident light metering method, exposure can be ascertained at the subject's various depths. The exposure values (EV) can be displayed as a rule at handheld exposure meters, and the difference between the two measured values results in the number of f-stops.

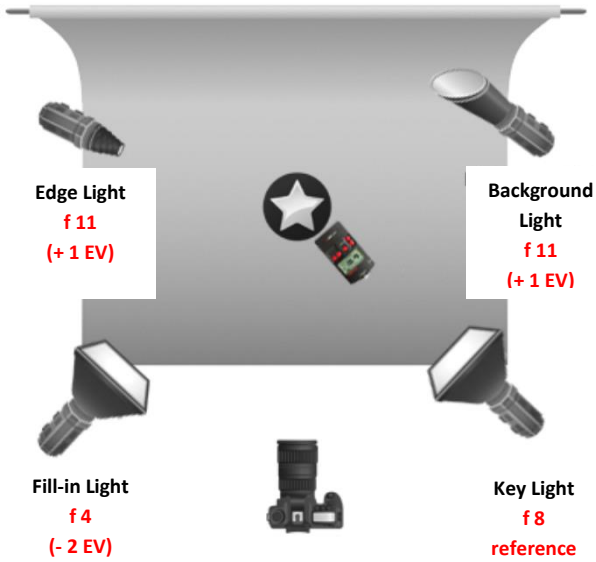


Flash Exposure Measurement in the Studio and Outdoors

Handheld exposure meters usually include a flash exposure measurement, i.e. they measure light from manually operated, compact flash units or studio flash units and ascertain correct exposure based on measurement results. The ratio between ambient light and flash is frequently displayed as well. When buying a handheld exposure meter, make sure that this function is supported!

Adjusting Lighting Contrast in the Studio

In studio photography, lighting contrast is selected depending on the desired visual message and image impact. It can be defined as the relationships which exist amongst key light, fill-in light, edge light and background light. The handheld exposure meter based on the incident light metering method is held at the subject facing the light source to be adjusted, whose power or distance is varied until the desired value is obtained. As a rule, key light is set as a fixed reference value which indicates the intensity of the other light sources as deviation from the reference value in f-stops (EV) with a fixed synchronization speed.



1. Key Light

- Flash power on medium value (adjusting range)
- ISO setting = nominal camera sensor sensitivity
- Synchronizing time = shortest camera setting for flash
- Defining f-stop, measuring and adjustment of flash power until reference value (f-stop) is achieved
- Set reference value on camera and keep it in mind
- All other lights will be set relatively to this reference

2. Fill-in Light

- Low lighting contrast (high-key)
  reference value – 1,0 EV (f-stop)
- Standard lighting contrast
  reference value – 2,0 EV (f-stop)
- High lighting contrast (low-key)
  reference value – 3,0 EV (f-stop)

3. Edge Light

- Reference value + 0.5 to + 1.0 EV (f-stop)

4. Background Light

- Setting dependent on the desired effect
- Bright white background
  reference value + 1,0 EV (f-stop)

Determining Subject Contrast [1]

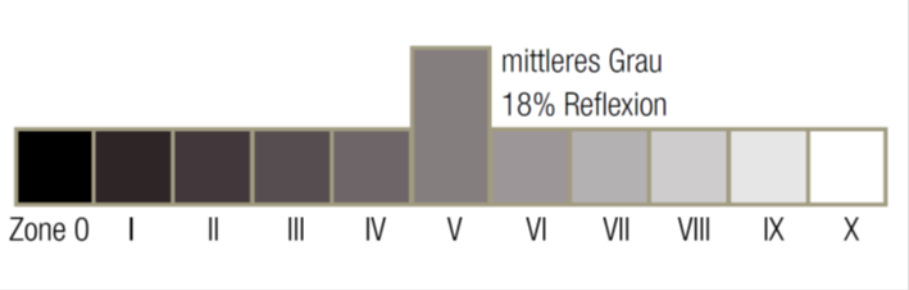
Handheld exposure meters can be used to ascertain subject contrast by means of the reflected light metering method. While pressing and holding the measurement key, the exposure meter is pointed at the various brightness values, one after the other, or it scans the entire subject to this end. Some simpler models then either display the f-stop range (smallest to largest f-stop) or, as is the case with the GOSSEN DIGISKY, the exposure value difference (EV, f-stops) is directly displayed and the minimum, mean and maximum values, as well as the associated f-stop / shutter speed combinations, can also be queried – ideal initial values for HDR photography or for adjustment to the contrast range of the image recording medium.

Spot Metering with Fixed Acceptance Angle [1]

As a rule, spot metering with handheld exposure meters uses a fixed, 1° angle of acceptance and is capable of measuring small areas very accurately within a complex scene, and it's also possible to generate a mean value by taking several measurements. As opposed to this, the measuring range for spot metering included with modern reflex cameras is indicated as a percentage of the image area (sensor). The angle of acceptance depends on, and changes along with, the lens's focal length.

Pre-Visualization of the Tonal Values with the Zone System [1]

With the zone system, final visual results can be viewed for creative planning before the image is recorded. Use of an 11-stage zone system makes it possible to evaluate deviating brightness within the subject in consideration of exposure, so that adequate tonal values and detail are present even in the bright and dark areas of the subject in order to ensure exact reproduction. As a standard feature, acquired measurement results correspond to the neutral gray tone (18% reflection) in the zone V tone scale. All of the details which are important for an image recording can then be individually measured on this basis, and their tonal value can be ascertained.



Conclusion

By working with exposure meters in actual practice, photographers become intuitively familiar with the relationships amongst recording sensitivity, exposure time and f-stop, as well as filter factors and correction factors, and learn how these different exposure aspects interact to create ideal results.

This gives rise to the following additional advantages:

- **Correct exposure**, even in unusual situations with regard to subject, lighting and image recording
- **Deliberate, targeted work** instead of tedious trial-and-error experiments
- **Reduced effort and time-savings** for many tasks, especially for flash and studio photography
- **Plannable, measurable and reproducible lighting conditions** assure foreseeable, constant results in the studio
- **More time for photography**, and less time spent on sorting through exposure variants and post-processing at the computer

In light of all of these positive aspects, there can be only one answer to the provocative question asked at the beginning of this article:

Working without a handheld exposure meter is possible, but it hardly makes sense!

[1] Depends on the respective model of the handheld exposure meter