

MACRO – CLOSE UP WORKSHOP

Kindly submitted by John Clare

Standard lenses are designed to be sharpest at infinity – this also applies to Zoom lenses. Macro lenses are designed to be sharpest at their closest setting – this is at the opposite end of the scale to Standard or Zoom lenses. A Macro Lens is designed and corrected for flat field reproduction.

If you are doing document copy work then a Macro Lens comes into its own. A standard lens is not designed to do this and for most field work out doors you generally don't shoot anything that fills the frame edge to edge in a flat field.

But Macro lenses do have the advantage of producing a larger image before adding extension. This is because the Macro lens will focus down much closer to the object being photograph than the equivalent standard lens. A typical 100 mm Macro lens can focus down to as close as 306mm.

Minimum focus for the following Pentax lenses are

85mm = 850 mm 135mm = 1405mm 100mm Macro = 306mm.

The difference and the advantage of the 100mm Macro is obvious.

Macro lenses are available in various focal lengths – the common sizes being:- 50mm or 55mm – 100mm or 105mm and 200mm There are other sizes like 58mm, 250mm.

50mm allows very little working distance between the front lens element and the object being photograph. The 100mm Macro Lens allows twice this distance.

Its common to see on Zoom lenses a “Macro Setting” - Zoom lenses do not have a true Macro function. What they have is the ability to be able to “Close Focus” For example a Pentax 40-80 Zoom Lens in standard setting can focus down to 1.2 metres. In Macro setting it will focus down to 370 mm – that's 830mm closer than the standard setting. The object being photograph will now be larger in the frame than it would have been at 1.2 metres because the camera is so much closer to the object.

Macro refers to the magnification rate, and X 1 is often referred to as life size. That is object appears on the image at the same size as they are in real life. In 35 mm, full frame digital sensor or film this is 24 mm x 36 mm. This is basically the same thing as taking a 35 mm slide mount and holding it flush against the object you are photographing. What ever appears within the side mount rectangle will be life size.

WAYS TO CREATE MAGNIFICATION

There are a number of ways such as:-

- 1) Diopters or Supplementary Lenses
- 2) Extension Tubes
- 3) Bellows Unit
- 4) Teleconverters
- 5) Stacking lenses
- 6) Lens Reversing

Diopters usually come in sets of 3 (+1 +2 +3) although they can be found in sets of 4. These are sometimes referred to as Supplementary Lenses. By adding these to the front element of a lens they allow the photographer to get the minimum focusing distance reduced for that particular lens. These Diopters can range in quality depending on the manufacture of the set. The advantage of diopters or supplementary lenses is that they allow the photographer to get in much closer to the object being photographed without spending mega bucks on expensive lenses. For example on a 135mm lens the following applies

<u>Combination</u>	<u>Minimum Distance</u>
Lens only No diopters	1405 mm
Lens + No 1 diopter	640 mm
Lens + No 2 diopter	470 mm
Lens + No 3 diopter	370 mm
Lens + No 1 & 2 diopters	370 mm
Lens + No 1 & 3 diopters	310 mm
Lens + No 1 - 2 & 3 diopters	260 mm

Extension Tubes

Extension Tubes usually come in sets of 3 or 4. These need to be an auto-set, which link the lens functions through to the camera body. There is no glass involved to alter the lens quality and there is no standard length camera manufactures make these tubes.

For example.

Nikon a set of 4 at	8mm – 14 mm – 27.5 mm – 52.5 mm
Vivitar a set of 3 at	12mm – 20 mm – 36 mm
Pentax a set of 3 at	12 mm – 19 mm – 26 mm

Using the above table as a comparison with the same 135 mm lens and the Vivitar Set the following applies

Lens only	1405 mm
Lens + 12 mm tube	950 mm
Lens + 20 mm tube	830 mm
Lens + 36 mm tube	690 mm
Lens + 12 & 20 mm tubes	710 mm
Lens + 12 & 36 mm tubes	630 mm
Lens + 20 & 36 mm tubes	610 mm
Lens + 12 – 20 & 36 mm tubes	590 mm

It can be seen using this particular 135 mm lens you gain greater magnification using Diopters than Extension Tubes.

Remember different lenses will produce different results to the above table. The above results are just a guide to what can be achieved.

Extension tubes will fit all your lens where as the diopters are made to fit only one filter thread size for example 58mm. If your lenses have different filter thread diameters such as 52mm – 58mm – 62mm they wont fit all these lenses.

Diopters and Extension Tubes can be used together I prefer the extension tubes over the diopters.

This is because I'm using a 100mm Macro lens that has a minimum focus of 306mm which is already very close to the subject. With all 3 Extension Tubes on the 100mm Macro lens, the front element only 80mm from the subject. This gives about 4x life size magnification and very small depth of field.

Bellows Unit

Bellows Units are expensive and are not really suitable for fieldwork. They are easily damaged and have no auto functions linking the lens to the camera. They do have their use as they allow large extension and therefore great magnification.

Teleconverters

They are available in various strengths being X 1.4 – X 2 or X 3. They need to be of a very high quality and are sometimes available as a match set with a particular lens. These matched sets are usually found in the longer focal lenses. If a X 2 teleconverter was to be added to an f4 lens it will now become an f8. The main drawback is the loss of focussing light and slower shutter speeds for correct exposure.

Stacking Lenses

This is attaching another lens to the front of the lens on the camera. Not very practicable to use but gives great magnification.

Reversing a Lens

Most camera manufactures at some stage have made reversing rings. By fitting a reversing ring to your camera, a lens can now be fitted to the camera body in reverse. There is no auto coupling of lens functions to the camera and you can't use the normal manual focusing system. To focus you have to move the camera backwards or forwards till the object comes into focus in the viewfinder.

Focusing rails

When involved in high magnification your depth of field and area of focus can become extremely small. For example DOF could be under, 10 mm or down to just a couple mm's. Therefore the position of the camera becomes a problem to get in exactly the right place for correct composition. A Focusing Rail allows the photographer to move the camera forward or backwards or to the left or right.

Angle of view for DOF

DOF becomes smaller as the enlargement increases therefore the angle or position of the camera to take the image is important. With the Sensor or Film plane parallel to the subject will produce the maximum depth of field even if this is extremely small.

Reflectors

Use a white card to reflect light back into the subject – it can make a huge difference to the image

Ring Flash

Expensive for beginners and most close work can be carried out without a ring flash or a low powered standard flash

Something to kneel on

Take a piece of plastic to kneel on or sit on. It's better than getting wet. It can also be used to put your camera bag on it if the ground is really wet.

Summary

Don't spend a lot of money to find out you don't like close up photography

- My advice
- Start with a good tripod that will get very close to ground level.
 - Set of diopters
 - A reflector
 - A couple of pieces of plastic

Happy fungi shooting