

Macro Photography

Chris Barry

What is macro?

Macro photography (or photomacrography or macrography), is extreme close-up photography, usually of very small subjects, in which the size of the subject in the photograph is greater than life size.

- How does this differ from close up photography?
- Macro is life size or bigger on the sensor
- Close up is less than life size on the sensor

Caladenia longicauda, subspecies
calcigena (Coastal white spider orchid)





Rabbit Orchid
Leptoceras menziesii

The ratio of the subject size on the sensor plane in the camera to the actual subject size is known as the reproduction ratio.

A macro lens is classically a lens capable of reproduction ratios equal to or greater than 1:1

Equipment

High quality macro lenses are often expensive **BUT** there are cheaper alternatives!

Equipment: add on filters

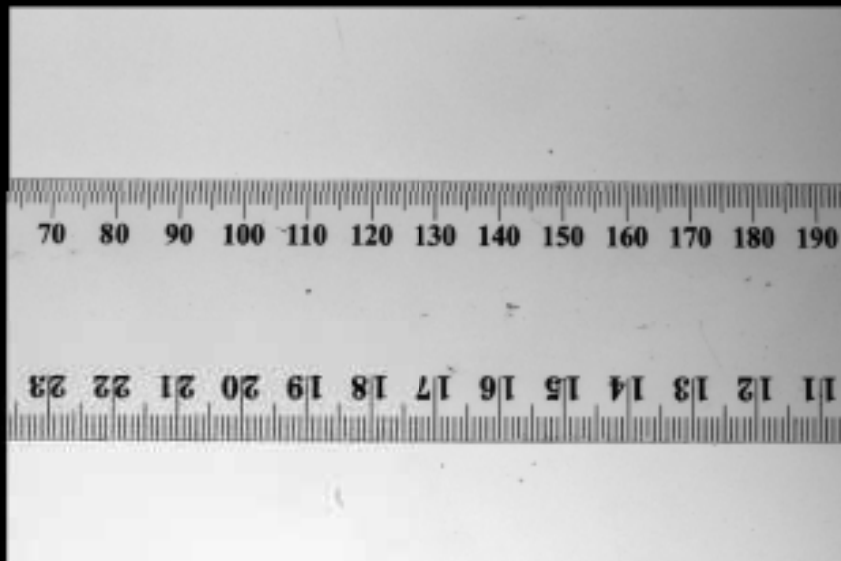
Ring attachment lenses are cheap.

They usually come as a set in 1, 2 and 3 dioptres and can be used together.

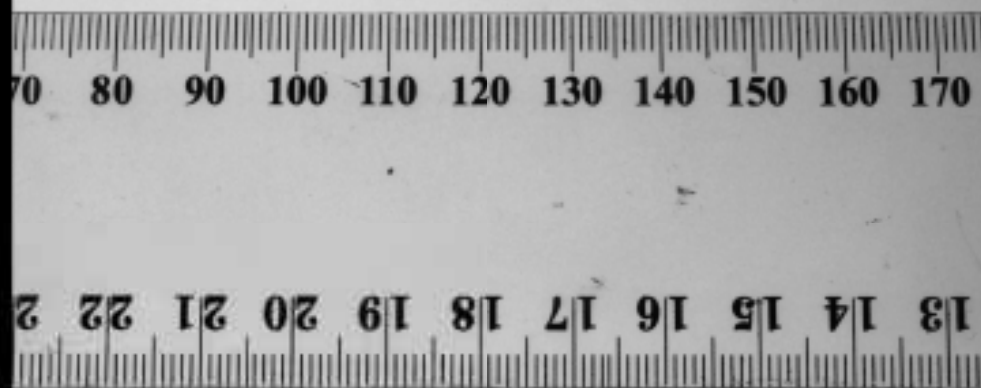
A dioptre is a unit of measurement of the optical power of a lens which is equal to the reciprocal of the focal length measured in metres. For example, a 3-dioptre lens brings parallel rays of light to focus at $\frac{1}{3}$ metre



Nikon 18-70mm lens



Nikon 18-70mm lens



Nikon 18-70mm lens plus 1 Dioptre



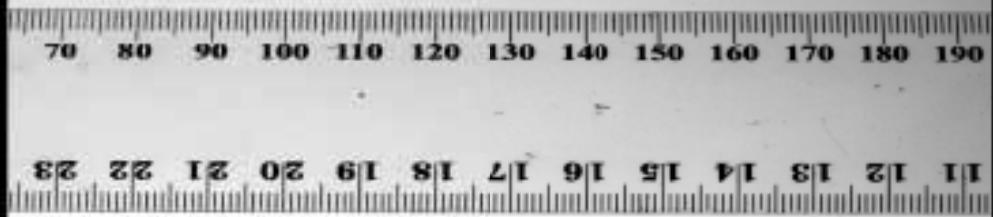
Nikon 18-70mm lens plus 2 Dioptres



Nikon 18-70mm lens plus 3 Dioptres



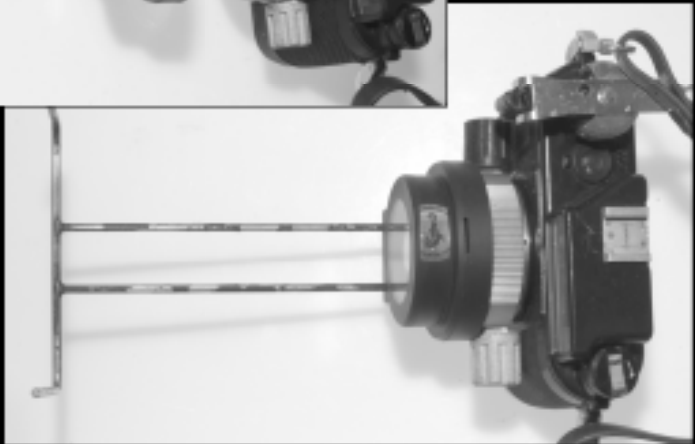
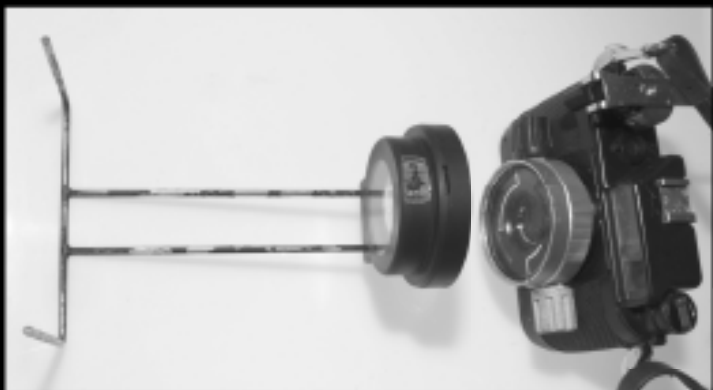
Nikon 18-70mm lens plus 8 Dioptres



Nikon 18-70mm lens



Nikon 18-70mm lens plus 6 Dioptres







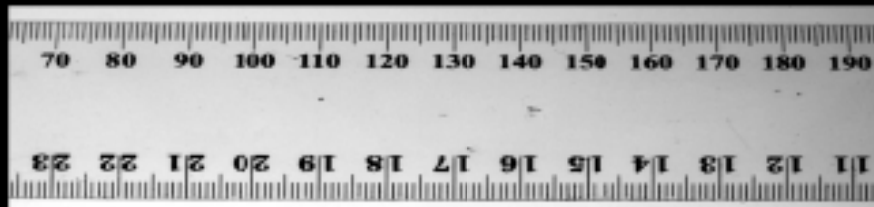




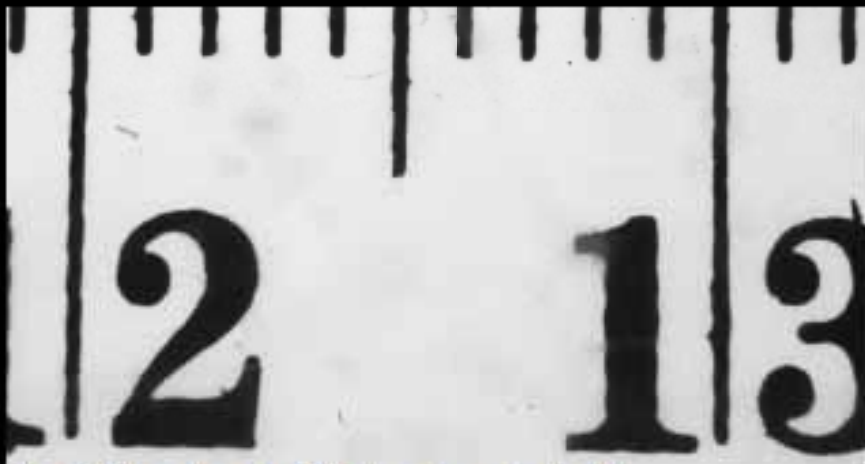
Nikon extension tube



Nikon 18-70mm lens plus 6 Dioptres plus extension tube



Nikon 18-70mm lens



Nikon 18-70mm lens plus 6 Dioptres plus extension tube

BUT!

Working distance between the lens and subject:

- Nikon 70mm lens = 190mm
- Nikon 70mm lens plus 8 dioptre lens = 90mm
- Nikon 70mm lens plus 8 dioptre lens plus extension tube = 5mm



Nikon 60 mm macro lens



Nikon 80mm macro



Nikon 105mm macro lens



Nikon 105mm macro

Working distance between the front of the lens and subject:

Nikon 70mm lens	= 190mm
Nikon 70mm lens 190mm plus 8 dioptre lens	= 90mm
Nikon 70mm lens 190mm plus 8 dioptre lens plus extension tube	= 5mm
Nikon 60 mm macro lens	= 80mm
Nikon 105 mm macro lens	= <u>150mm</u>

reversing the lens increases lens to
subject distance but lens loses
automatic features







EF-S 60mm f/2.8 Macro LBM Lens

★★★★★ [View all Reviews](#)

The EF-S 60mm f/2.8 Macro LBM is the perfect macro lens for EF-S lenses. It features a compact, slim form factor and a wide-angle field of view. It's the perfect lens for your eyes.

- Excellent quality
- Perfect for travel

[Add to wishlist](#)

[View on eBay](#)

[Buy now](#)

Life-Size Converter EF



Life-Size Converter EF Lenses

Designed by the EF-S 60mm f/2.8 Macro LBM lens, the Life-Size Converter EF Lenses are designed to provide a wide-angle field of view. The Life-Size Converter EF Lenses are designed to provide a wide-angle field of view. The Life-Size Converter EF Lenses are designed to provide a wide-angle field of view. The Life-Size Converter EF Lenses are designed to provide a wide-angle field of view.

- Excellent quality
- Perfect for travel

[Add to wishlist](#)

[View on eBay](#)



MP-E 64mm f/2.8 1-2x Macro Lens

★★★★★ **5.0 out of 5 stars**

A unique macro lens that lets you get closer to your subject, between 0.125x (1/8x) and 2x magnification, with a maximum reproduction ratio of 1:1. This lens offers a range of close-up options, with the ability to shoot and focus at 1:1 and 2x. It includes the best for macro work, including the lens, water-repellent. The optical system uses a floating system to provide optical quality at 1:1, 2x, infinity, and 0.125x.

- Limited Stock
- Order by 11:59pm

[View Details](#)

[View Image](#)



MP-E 64mm f/2.8 1-Dx Macro Lens

★★★★★ [View all reviews](#)

A unique macro lens that includes provisions for high-magnification, between 0.5x and 5x, and 0.5x to 5x - 5:1 magnification capabilities, you can fill a frame with a pair of eyes, a petal, or the intricate web of an insect and more. Even more, it includes the tools for excellent autofocus, as well as for macro photography. The optical system uses a floating system to prevent axial coma due to different amounts of light rays.

EF 100mm f/2.8L Macro IS USM Lens



EF 100mm f/2.8L Macro IS USM Lens

★★★★★ [View all reviews](#)

The EF 100mm f/2.8L Macro IS USM lens features a 1:1 macro and 10x magnification of macro subjects in dry mode and 5x magnification in high-magnification mode. Coating reduces

- Dustproof & Moisture Resistant
- Aspherical Lens Element

[Add to wishlist](#)

[View more like](#)



MP-E 60mm f/2.8 1-Dx Macro Lens

★★★★★ Best of Series

A compact macro lens designed specifically for the 1-Dx camera, featuring 0.25x magnification (1:4 reproduction ratio) and a 11-blade aperture. It's also compatible with the Macro Ring-Lock and Ring-Lock II systems. It includes the same 9-point autofocus system as the 1-Dx camera, ensuring sharp focus on your subjects. The optical system uses a floating system to prevent axial chromatic aberration across the entire magnification range.

MP-E 60mm f/2.8 1-Dx Macro Lens



EF 100mm f/2.8L Macro IS USM Lens

★★★★★ Best of Series

The EF 100mm f/2.8L Macro IS USM lens features a 1:1 magnification and 11-blade aperture. It's also compatible with the Macro Ring-Lock and Ring-Lock II systems. It includes the same 9-point autofocus system as the 1-Dx camera, ensuring sharp focus on your subjects. The optical system uses a floating system to prevent axial chromatic aberration across the entire magnification range.

- Dust Seal System
- Ring-Lock II System

EF 100mm f/2.8L Macro IS USM Lens



EF 180mm f/3.5L Macro USM Lens

★★★★★ Best of Series

Another telephoto macro lens, the EF 180mm f/3.5L Macro USM lens features a 1:1 magnification and 11-blade aperture. It's also compatible with the Macro Ring-Lock and Ring-Lock II systems. It includes the same 9-point autofocus system as the 1-Dx camera, ensuring sharp focus on your subjects. The optical system uses a floating system to prevent axial chromatic aberration across the entire magnification range.

- Dust Seal System
- Ring-Lock II System

MP-E 60mm f/2.8 1-Dx Macro Lens

EF 100mm f/2.8L Macro IS USM Lens



Sigma sells 5 macro lenses including this 70-300mm



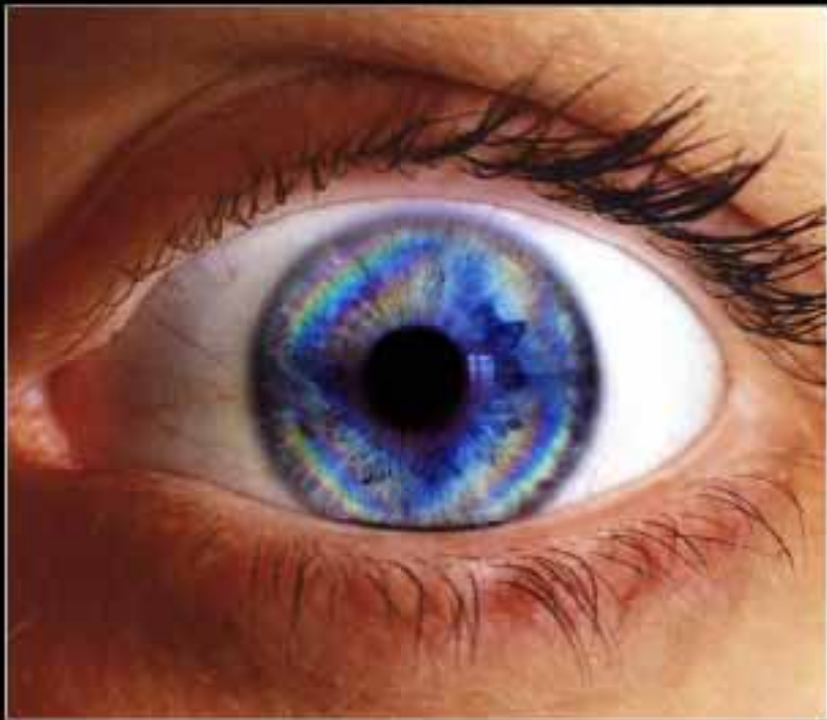
Tamron make 5 macro lenses including this 70-300 macro zoom

Focusing on small objects with a tripod may be difficult,
often a slider helps!



Bellows can replace extension tubes and are variable in length





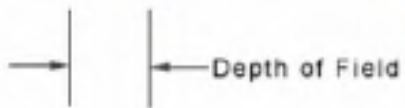


Or use a copy stand!



Depth of field

depth of field is the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image



Depth of field is determined by subject magnification
at the sensor plane
and the selected lens aperture or f -number

The f-number N is given by $N=F/D$

where F is the focal length

D is the diameter of the entrance optic

For example, if a lens's focal length is 10 mm
and its entrance pupil diameter is 5 mm

the f-number is 2

the aperture size would be expressed as $f/2$.

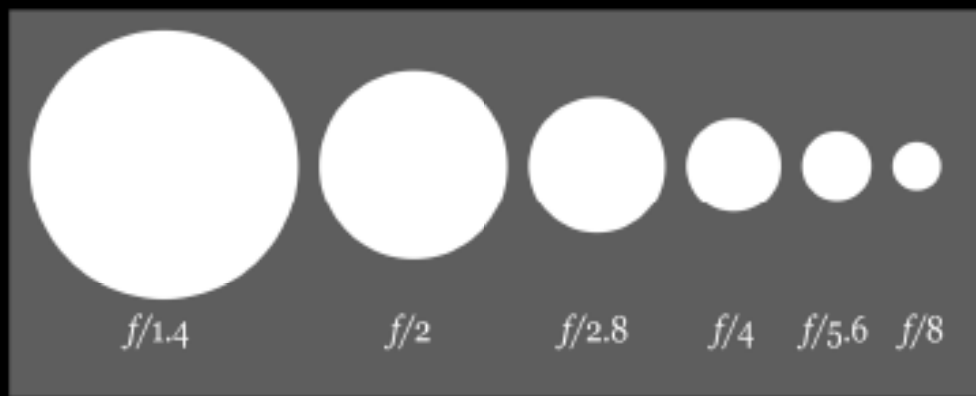


Diagram of decreasing apertures, that is, increasing f-numbers,
in one-stop increments
each aperture has half the light gathering area of the previous one.

increasing the f -number
(decreasing the aperture diameter)
increases the depth of field



This [integrated circuit](#) which is in focus in this macro shot, is 2.5 mm higher than the circuit board it is mounted on.



Canon 85mm 1:1 hand held (f16 plus flash)

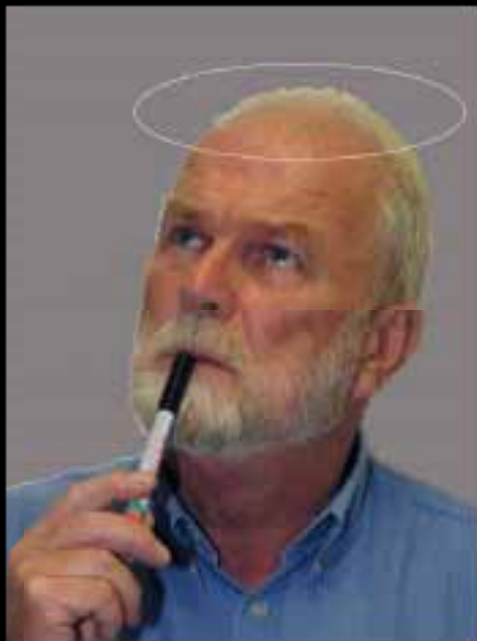


Canon 85mm 1:5 hand held (f16 plus flash)

Focus stacking is a digital image processing technique which combines multiple images taken at different focus distances to give a resulting image with a greater depth of field



Circle of confusion



Too hard for today!

That's all folks!