

# Macro Lens, Extension Tubes, or Close-Up Filters?

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## Introduction

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You've decided that you want to try macro photography. Which tool should you choose — a dedicated macro lens, a macro zoom lens, extension tubes, or close-up filters? This is a short guide to the strengths and weaknesses of each approach.

Note: For brevity, I am going to use 'macro' to include closeup (1/10 to lifesize magnification), macro (lifesize to 10 times magnification), and micro (10 times and higher magnification).

## Close-Up Filters

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Close-up filters are magnifying lenses that screw into the front filter thread of your lens. They come in various strengths, typically +1, +2, +4, and +10. The higher the strength, the greater the magnification, and the closer you can get. They can be stacked to increase the effect. Always put the largest value filter closest to the lens.

### Advantages.

- **Price:** The filter options for trying macro photography vary dramatically in quality and price. The cheapest ones are often poor quality, while the best ones can cost hundreds or even thousands of dollars each. Avoid the very cheapest unless you want distortion and imperfections, and the most expensive unless you really need that level of performance. A set of 3 (+1, +2, +4) will serve most purposes.
- **Weight and bulk:** A set of filters is much lighter than a macro lens.
- **Ease of Use:** Because they go on the front of the lens, they do not affect the relationship of the lens to the camera. All the electronics work, and the lens will autofocus normally. They can also be stacked with other filters. In that case, always put the close-up filter(s) closest to the lens.

## Drawbacks and Considerations.

- **More glass:** Each close-up filter adds a layer of glass, and two more glass/air interfaces to your lens. This is two more surfaces to collect dust, and one more layer of glass and two more interfaces to degrade contrast and sharpness.
- **Field Curvature:** Ordinary camera lenses (zoom or prime) are not flat field. This is unimportant at normal focus distances, but becomes important with macro distances. A close-up filter *cannot* correct this.
- **Inconsistency:** Lenses from different manufacturers may not be compatible, and some don't use standard diopter designations. Read the fine print!
- **Single Size:** Each set fits one size of filter thread. If you have lenses with different size filters, you will need more than one set. You might be able to get away with a step-down ring, but it may affect the focusing.
- **Zoom lenses** may not play nice with close-up filters at all focal lengths. Prime lenses are usually a better bet.
- **Vignetting:** Some filters will cause vignetting, especially with wide angle lenses, or the wide end of a zoom.
- **Not all lenses** can accept these filters. Some have too much bulge on the front element. Needless to say, you can't use them on a lens with no filter thread!

## Extension Tubes

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Extension tubes mount between your lens and the camera. They physically move your lens further away from the sensor, which allows it to focus closer. They contain no glass. The longer the tube, the closer you can focus. You can buy a single tube, or buy sets of different lengths (typically 2 or 3). You can use one from the set, or stack them to get a longer tube (and thus focus even closer).

### Advantages.

- **Optically Neutral:** Unlike close-up filters, there is no extra glass to degrade contrast, attract dust, etc.
- **Light Weight:** Compared to a dedicated macro lens, extension tubes tend to weigh very little. They do weigh more than the typical close-up filter.
- **Durable:** No glass ('nuff said).
- **Versatile:** They will fit all lenses with that mount.
- **Cost effective:** They tend to be a lot cheaper than a dedicated macro lens.

## Drawbacks and Considerations.

- **Limited Focus Range:** They move your lens further away from your sensor. This means that you will not be able to focus on more distant objects until you remove the tube. Especially if you are trying to get just a bit more magnification than normal, you may find yourself swapping the tube in and out a lot.
- **Length:** A tube may be too long for your particular lens. This will prevent you from getting sharp focus at all on a prime, or at shorter focal length settings on a zoom. In effect, the plane of focus ends up inside the lens. As a rough rule of thumb, the length of the extension tube cannot exceed the focal length of the lens. In my experience, extension tubes work best on normal to telephoto lenses.
- **Contacts:** Tubes go between the lens and the camera body. They may interfere with electronic contacts or mechanical linkages. This can disable or adversely affect autofocus, EXIF data, aperture, etc. Check the fine print! Generally, the more expensive the tubes, the more likely they are to support connections. You may be happy without connections, if you are willing to manual focus, set apertures, etc.
- **Quality of Construction:** Cheap tubes may be poorly made. Check to make sure they fit your camera and lens, and that connections work.
- **Vignetting:** Some combinations of lens/zoom length and tube will vignette. There is no reliable way to be sure without trying it. The problem is worse on tubes with a small internal diameter (usually cheaper tubes).
- **Flare:** If a tube is not matte black on the inside, it will reduce image contrast.
- **Distortion:** Zoom lenses are designed to minimize distortion at specific focal lengths (either optically or through software correction). Moving the whole lens away from the sensor can defeat the design. The degree of distortion can only be determined by experimentation.
- **Field Curvature:** Ordinary camera lenses (zoom or prime) are not flat field. This is unimportant at normal focus distances, but becomes important with macro distances. Extension tubes do not correct this.
- **Learning Curve:** Extension tubes can be a very effective tool, but require the most 'getting used to.'

## Macro Zoom Lenses

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Many zoom lenses are sold as “macro zooms.” This is marketing speak for “it focuses closer than some other zoom, maybe, sort of, at some focal length(s).” You need to check the actual specifications and performance of each one to see what it can do. Beware especially “closest focusing distance” and “magnification” specifications. These often apply at only one focal length, which may or may not give you the results you want. If you want to do a lot of moderate closeups, such as whole flowers, they may work well for you, but test before you buy. You should also consider the overall quality of the lens, as it will probably be used for many different types of photography.

### Advantages.

- **Convenience and Versatility:** These lenses are great for travel, general carrying, and other situations where you might want a close-up, from time to time.

### Drawbacks and Considerations.

- **Compromise:** Adding close-up capabilities to a lens, especially a zoom, will lead to compromises elsewhere in its design. These lenses may suffer from lowered sharpness or other optical compromises. They are also likely to be slower (f stop and autofocus) and weigh more than a similar lens without close up capacities.
- **Field Curvature:** These lenses are not flat field. They are designed to be used at a wide range of focal lengths and curved field is preferable at normal focus distances. At higher magnifications, a flat focal plane becomes increasingly desirable. A macro zoom lens will not perform anywhere near as well as a true macro lens.

## True Macro Lens

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A true macro lens is a single focal length (prime) lens optimized for close focusing. Despite this, many macro lenses work quite well at all focusing distances. You need to read specifications and reviews for any macro lens you wish to buy. *Caveat emptor!* There is an IACC buying guide for macro lenses at [https://www.imagesalberta.ca/uploads/5/9/3/7/59372331/how\\_to\\_choose\\_a\\_macro\\_lens.pdf](https://www.imagesalberta.ca/uploads/5/9/3/7/59372331/how_to_choose_a_macro_lens.pdf). Get the right one first time!

## Advantages.

- **Quality:** Best sharpness, contrast, etc.
- **Flat Field Focus:** Macro lenses are designed to optimize performance at close focusing distances. Any true macro lens should have a truly flat plane of focus (flat-field design). Non-macro lenses are almost always curved field design, with the plane of focus slightly curved. This is unnoticeable at longer distances, but becomes critical as you get closer. This is because you have less depth of field as you get closer. With a flat field lens, if you are parallel to and focus on the middle of something small and flat such as a stamp, the corners will all be in accurate focus as well.
- **Full Focal Range:** Unlike extension tubes and close-up filters, you can focus on anything between the closest focusing distance and infinity without adding or subtracting bits from your lens.
- **Function:** You have all your normal controls and functions, if the lens is compatible with your camera.

## Drawbacks and Considerations.

- **Price:** Bluntly, if you want the best macro performance, you will need one or more dedicated macro lenses -- and you will have a considerably lighter wallet. Buying a true macro lens is a significant investment.
- **Even Closer:** Extension tubes can be used with macro lenses to get even closer.
- **Restrictions:** A few macro lenses do not offer full infinity focus. Others may not connect properly to your camera. Check the details of any lens you wish to purchase or use.
- **Size and Weight:** A macro lens will normally be significantly larger and heavier than a non-macro prime with the same specifications.
- **Fake News:** Just because a lens is marketed as a macro lens, doesn't mean it is. Read the specs and the reviews!

## Conclusion

So, in the end it's all up to you. Pick the solution that best suits your needs. If you are just starting, and are not sure you will do much macro, close-up lenses are likely your best bet. For an all-round solution, perhaps a macro zoom. A bit more serious? Extension tubes may be the way to go, especially if you already have a few good prime lenses. And if the bug really bites, one or more dedicated macro lenses.

In any case, **have fun!**