Sigma 180 mm f/2.8 APO Macro EX DG OS HSM

1. Introduction
Sigma offers you a lot of macro lenses with different focal lengths: 50, 70, 105, 150 and 180 mm. From some time now that company have been launching newer versions of those devices with image stabilization and HSM autofocus ultrasonic motors. In recent years we've seen the Sigma 105 mm f/2.8 EX DG OS HSM Macro and the Sigma 150 mm f/2.8 APO EX DG OS HSM Macro introduced to the market. The latest launch concerned the Sigma 180 mm f/2.8 APO Macro EX DG OS HSM which is a kind of exceptional instrument. Here the producer decided to add not only stabilization but also they enlarged its relative aperture from f/3.5 to f/2.8 – it makes the new Sigma the fastest macro lens with that focal length on the market.

We weren't impressed by the older version of the Sigma 180 mm f/3.5 EX DG HSM as, out of all Sigma macro devices tested by us, it got the lowest score. That's why we were very curious how its successor would fare. We didn't hesitate to check it as soon as possible and the results of our tests and our impressions you can find in the next chapters – enjoy!

We would like to thank the Sigma ProCentrum company for lending the lens for the testing purposes.
You are also invited to get acquainted with our test procedure, described in the article "How do we test lenses?" If you feel it's still not enough, please go to our FAQ section where you can find some further explanation.
2. Pictures and parameters

<table>
<thead>
<tr>
<th>Construction:</th>
<th>14 groups / 19 elements</th>
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</thead>
<tbody>
<tr>
<td>Field of view:</td>
<td>13.7 deg. (9.0 deg. for APS-C/DX)</td>
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<tr>
<td>Aperture:</td>
<td>f/2.8</td>
</tr>
<tr>
<td>Min. focusing dist.:</td>
<td>0.47 m</td>
</tr>
<tr>
<td>Filter size:</td>
<td>86 mm</td>
</tr>
<tr>
<td>Dimensions (length x diameter):</td>
<td>203.9 mm × 95.0 mm</td>
</tr>
<tr>
<td>Weight:</td>
<td>1638 grams</td>
</tr>
<tr>
<td>Price:</td>
<td>1700 $</td>
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3. Build quality and image stabilization

If you take into account macro lenses, the Sigma 2.8/180 OS features the longest focal length of all the instruments, produced by this company – small wonder its dimensions are significant. Its fast aperture is also a significant feature – the predecessor’s maximum relative aperture was f/3.5 and the same can be said about its renowned rivals. The comparison between them is shown in the following chart. The new Sigma is here undoubtedly the biggest and the heaviest. The fastest aperture makes itself felt (a huge front element demands using filters with a diameter as big as 86 mm); add to it a very high number of optical elements – 19, not less. It is also worth comparing the Sigma to other macro 100 mm lenses – such a comparison gives you a better idea how big the tested instrument really is. In the photo below the Sigma is positioned next to the Canon 2.8/100L IS USM, assessed by us very well in the test.
The tested lens starts with a metal mount and contacts; the mount surrounds an immobile rear element which is 3 cm in diameter. It hides inside the mount about 1.5 cm deep. The area around it is dark and matt, you can’t see any electronic parts next to it.

The proper body of the lens starts with a metal, black fragment of the casing where you find just a white dot, making the alignment with the camera easier. Further on you see a tripod adapter which comes in the box with the lens. The body behind the adapter is covered by black, smooth plastics. First there is the name of the lens
and its parameters. On the left you can find a series of switches. The first of them allows you to choose the range of the focusing mechanism – there are three possibilities: FULL, from 0.67 of a meter to infinity and from 0.47 to 0.67 of a meter. The second switch, marked as AF-MF, is used to choose a mode of the focusing mechanism. The third and the last switch allows you to operate the optical stabilization. You can turn it off (OFF) or set in 1 (normal) or 2 (panoramic) mode.

Above the inscription with the name and the parameters of the lens you get a window with a distance scale, expressed in metres and feet. It is a pity the producer didn’t decide to add a depth of field scale as well. The next element is a huge (its width amounts to as much as 55 mm) and ribbed manual focus ring. Its work is smooth and well-damped. Running through the whole scale takes a turn through as much as 270 degrees. Such a wide angle allows very precise settings in the macro working distances but in normal distances it fares not so well. If you want to run the scale from one meter to infinity you must turn the ring through 90 degrees. Behind the ring there is an immobile part of the casing with a golden stripe (characteristic for the EX series) and a hood mount. It surrounds a non-rotating filter thread, 86 mm in diameter, and a front element, immobile as well, with a diameter of 77 mm. The front element is hidden just slightly inside the casing - about 0.5 cm deep. It's also worth adding that while taking photos with 1:1 reproduction ratio your photographed object is situated in the distance of 21.5 cm from the front element.

When it comes to the optical construction Sigma company certainly wasn’t stingy. You get overall 19 elements positioned in 14 groups. As many as three elements are made of FLD low dispersion glass which optical properties are supposed to match those of fluorite. Inside you also find a circular aperture with nine blades which can be closed down up to the value of f/22.
When it comes to the EX series you can’t carp about the number of accessories – there are as many of them as it should be in the case of an expensive, top-of-the-range instrument. Buyers get both caps, a solid, metal tripod adapter, a hood with a special extension for the APS-C/DX format and a stiff case of high quality with a strap. If the producer added to that an UV filter, protecting the front element, you would get indeed a perfect package. Still I have to admit such a requirement goes slightly over the top – an 86 mm filter is rather expensive. On the other hand, though, Sigma like surprising their customers with different special offers and they have added UV filters to their lenses free of charge before. Perhaps they will be tempted to do it again also in the case of this lens.

It is also worth mentioning that the tested lens is compatible with 1.4x and 2.0x Sigma APO teleconverters.

**Optical stabilization**
Sigma boast that the optical stabilization, used in the tested lens, is as efficient as 4 EV. Of course we didn’t fail to check that claim. In order to do that we took several dozen photos at every exposure time ranging from 1/200 to 1/4 of a second for the stabilization switched on and off. A graph, which you can see below, shows the percentage of blurred photos as an exposure time function, expressed in EV; the zero points corresponds here to 1/160 of a second.
The result is a bit surprising. I admit I got used to the fact that few lenses reach those declared 4 EV (it concerns not only Sigma lenses but also instruments of other makers). However I expected a result on the level of 3-3.5 EV and here the value we got is even lower. The maximum distance between both curves amounts to 2.7 EV and so we assess the efficiency of the stabilization of the tested lens. It is not a bad result but it hardly impresses if you take into account the amount of money you must pay for the Sigma.

4. Image resolution
The resolution test of the Sigma 180 mm f/2.8 APO Macro EX DG OS HSM was based on RAW files from the Nikon D3x reflex camera, developed without sharpening by the dcraw program. Let’s remind you here that in the case of tests performed with the D3x a decency level is situated near 30-31 lp/mm and the best fixed-focus lenses can go as high as 45-46 lp/mm.

Let’s check how the tested lens fares here. Below there are its results in the frame centre, on the edge of the APS-C/DX sensor and on the edge of full frame.

Such views we would like to see every time. The Sigma performance is simply beyond reproach. Already at the maximum relative aperture you get a very high MTF50 value, reaching 41 lp/mm. On stopping down the aperture to f/4.0 the results increase to an almost record breaking level of 45 lp/mm.
On the edge of the frame the situation is equally good. The Sigma 2.8/180 OS on the edge of the APS-C/DX sensor can be sharper than some ‘primes’ in the frame centre. What’s more, the more demanding edge of full frame fares just slightly worse. The image you can get there is of a very high quality even at the maximum relative aperture!

In order to show you how good the Sigma is it would be enough to write that practically at every aperture and across the whole frame the lens is better than the Canon EF 200 mm f/2.8L USM II, so praised and liked by many users. Personally I haven’t tested such a sharp full frame instrument for a long time – let this sentence substitute a summary here!

Photos below show how the centre of our testing chart looks by f/2.8 and f/4.0, registered as JPEG files from the Nikon D3x and saved along RAW files, used for the analysis above.
5. Chromatic and spherical aberration

Chromatic aberration

When it comes to the longitudinal chromatic aberration it would be difficult to notice it even at the maximum relative aperture. Those FLD low dispersion elements, so praised by the producer, seem to be working properly.

The situation is similar with lateral chromatic aberration. It is true that it increases with the stopping down, which is not a good news in the case of a macro lens because after all you very often stop it down significantly, but even at its maximum level it doesn’t reach the medium values. It will hardly bother you in real life photos. In most of cases you won’t notice its influence at all.
Spherical aberration

Spherical aberration can be described in equally positive terms. Firstly there is no focus shift, secondly defocused images of a diode are nice to look at. The light in the circles is more or less evenly spread and images you get in front of and behind the focus are very similar to each other.

6. Distortion

You can forget completely about the distortion here – it is negligible on both types of detectors. On the smaller APS-C/DX sensor it reaches a value of 0.15% so practically zero. On full frame its level is just slightly higher, amounting to 0.23%.
7. Coma, astigmatism and bokeh

The Sigma 2.8/180 OS corrects the coma in a perfect way. Its performance here is so good that if I randomly swapped places of the thumbnails below nobody would notice. Once again the tested lens deserves our praise!

The astigmatism correction can be described in a similar manner. An average difference between horizontal and vertical MTF50 function values amounted to just 3.5% which is a very good result.

When it comes to the appearance of defocused light points here we also don't have any major reservations. At the maximum relative aperture everything is as it should be. The light spread in the circles is very even; after stopping down you can notice a rim but it is nothing you should seriously worry about. Still, we are a little less impressed by the fact that even by f/5.6 the image is still far from a circle.
8. Vignetting

Thumbnails below show that on the smaller APS-C/DX sensor the vignetting can be noticed only at the maximum relative aperture. The value of that aberration, measured by us there, amounted to 24% (-0.80 EV) – in our view still a moderate level. On stopping down to f/4.0 you see all the problems disappear because the vignetting decreases to a negligible value of 8% (-0.25 EV).

For obvious reasons there will be more problems on full frame; still it doesn’t mean these problems are exceptionally acute.
At the maximum relative aperture the brightness loss in the frame corners is 36% (-1.30 EV). It is significant but you shouldn’t panic – on stopping down the situation improves very quickly. The vignetting decreases to 19% (-0.61 EV) if you use f/4.0 aperture and when you stop down further it reaches value which we deem to be imperceptible or just slightly bothersome. The official results we got by f/5.6 and f/8.0 are respectively: 13% (-0.40 EV) and 9% (-0.26 EV).
9. Ghosting and flares

When it comes to work against bright light everything seems to form a conspiracy against the tested Sigma. You deal here with as many as 19 elements here so the number of air-to-glass and glass-to-glass surfaces is huge. At the front of the lens there is a big element, not sheltered by anything. Add to it the inner focusing which makes it more difficult to insert immobile shields, limiting the flares. All of it gives results like those in the photos below – not especially good. In this category the tested Sigma has its first slip-up then.
10. Autofocus
The tested Sigma is equipped with an ultrasonic focusing mechanism (HSM); small wonder the autofocus works noiselessly. Unfortunately we can't praise its speed. Running through the whole distance scale in good lighting conditions takes about 2.5 seconds and when the conditions are worse it can last even about 3 seconds. Such a result is weak. Still you must remember that you deal here with a macro lens which has to service a very wide distance range.

Fortunately the Sigma company decided to use a focus limiter. When you choose the 0.67 of a meter to infinity range the working pace increases and running through the scale takes about one second. Still it is not a result which would bowl us over. In order to assess it objectively, though, you must compare it to speeds recorded by the rivals. For example the Canon 2.8/200L is just slightly faster (0.8-0.9 of a second) but its minimum focus amounts to 1.5 metres. As you see the Sigma compares here really favourably. In fact you might start wondering...
why Sigma chose the value of 0.67 of a meter and not 1 meter as the beginning of the limited range. The value of about 1 meter would be more appropriate and would make the autofocus really fast.

When it comes to the accuracy of the autofocus we don’t have any reservations. The mechanism in studio conditions performed very well, missing in less than 3% of cases.

We haven’t noticed any distinct front or back focus tendencies. It is true that in the photos taken using the Nikon D200 you could see a slight shift of the depth of field in front of the proper object but this effect is slight and, after all, the depth of field still includes your aim.
11. Summary

Pros:

- very good build quality,
- excellent resolution in the frame centre,
- sensational resolution on the edge of the frame, also on full frame,
- very well corrected chromatic aberration,
- slight spherical aberration,
- negligible distortion,
- unnoticeable comma,
- low astigmatism,
- not very bothering vignetting on the smaller sensor,
- silent and accurate autofocus,
- rich standard accessory kit,
- three-year warranty period with a possibility of extending it further.

Cons:

- work against bright light could have been better.

Sigma Corporation has been emphasizing for some time now that they are bored with being perceived as a producer of cheaper and worse equivalents of brand name lenses. Currently they strive to be treated as a serious manufacturer of high quality optics which products can compete easily with the best instruments on the market. The results of this test prove it clearly – the company doesn’t joke. The Sigma 180 mm f/2.8 APO Macro EX DG OS HSM is a sensational lens, practically faultless, which fully deserves the badge below. It’s worth noticing that we aren’t lavish with our badges and the number of lenses, tested by us, which have got it is limited indeed. To make you realize better how good the performance of the tested Sigma is we can write that in many categories it fared better than the well-known and much-liked Canon EF 200 mm f/2.8L USM II. Another advantage of the Sigma is the fact that it is really a fully-fledged macro lens.

However the new Sigma policy has also its darker points: namely they assume you have to pay a lot for high quality. The price of the Sigma 2.8/180 OS is really exorbitant. It’s enough to say it is twice as high as the price of the Canon 2.8/200L, mentioned above. If you start comparing prices, however, and you take the immediate rival of the tested lens into account - the Canon EF 180 mm f/3.5L USM Macro - you can find out that their price tags are very similar. In fact the Sigma compares quite well here because it gives you additionally stabilization and a better fastness for the same sum of money. The situation looks even better if you compare it to the elderly Nikkor AF 200 MM F/4D ED-IF Micro. The price difference is slight and the Nikkor is even slower than the Canon, it lacks stabilization and an ultrasonic motor.

To sum up if I was thinking about buying a 180 mm class lens nowadays I would be sorely tempted to purchase the Sigma – there are so many arguments in its favour that it would make me resign from other brand name lenses.