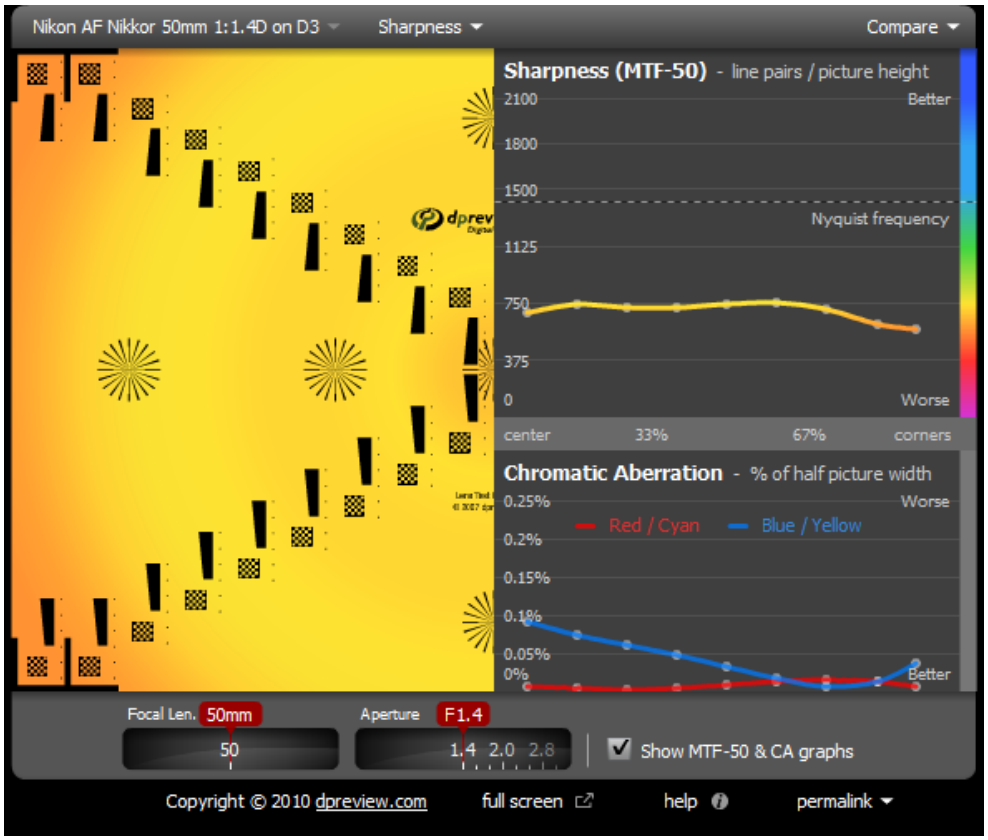
5. Test results (FX)

## Studio Tests - FX format




NOTE the line marked 'Nyquist Frequency' indicates the maximum theoretical resolution of the camera body used for testing. Whenever the measured numbers exceed this value, this simply indicates that the lens out-resolves the sensor at this point - the calculated MTF values themselves become meaningless.

The Nikon AF-Nikkor 50mm 1:1.4D gives a somewhat mixed performance on FX, although one that will come as no surprise to anyone experienced at shooting film. Performance is unremarkable at wider apertures where the new Sigma 50mm F1.4 EX DG HSM does much better, however image quality increases rapidly on stopping down, giving excellent results between about F4.5 and F16.

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| **Resolution** | In FX as on DX, the lens is soft wide open across the frame but improves rapidly on stopping down, with the centre excellent by F2, and the corners catching up at F4.5. Optimum results are obtained between F5.6 and F11, where it comfortably outresolves the D3's sensor right across the frame; stopping down further naturally gives a gradual reduction in sharpness due to diffraction. |
| **Chromatic Aberration** | Lateral CA is extremely low with practically no visible fringing. However as on DX, the non-zero CA figures towards the centre at wide apertures betray a more problematic issue, high levels of mainly blue 'colour blur' due to axial chromatic aberration, which essentially disappear on stopping down to F2.8. |
| **Falloff** | We consider falloff to become perceptible when the corner illumination falls to more than 1 stop less than the centre. Falloff is about average for its class on full frame at 2.7 stops wide open, falling to below 1 stop on stopping down to F2.8; this will certainly be high enough to cause concern for some users. |
| **Distortion** | Distortion on full frame is about 1.3% barrel; this is towards the high end for a 50mm standard prime, and has the potential to be visible in real-world shots. |

### FX compared to DX

Eagle-eyed viewers will no doubt have noticed that the MTF50 sharpness data at any particular focal length/aperture combination is distinctly higher on FX when compared to DX. This may at first sight appear

unexpected, but in fact is an inevitable consequence of our presentation of the sharpness data in terms of line pairs per picture height (and thus independent of format size).

Quite simply, at any given focal length and aperture, the lens will have a fixed MTF50 profile when expressed in terms of line pairs per millimeter. In order to convert to lp/ph, we have to multiply by the sensor height (in mm); as the full-frame sensor is 1.5x larger, MTF50 should therefore be 1.5x higher.

In practice this is an oversimplification; our tests measure system MTF rather than purely lens MTF, and at frequencies close to Nyquist the camera's anti-aliasing filter will have a significant effect in attenuating the measured MTF50. In addition, our testing procedure involves shooting a chart of fixed size, which therefore requires a closer shooting distance on full frame, and this will also have some influence on the MTF50 data.

### Macro Focus

**Macro -** 249 x 165 mm coverage
Distortion: Moderate barrel
Corner softness: Moderate
Focal length: 50mm

The 50mm behaves similarly in our macro test on full frame as on DX. Naturally the close focus, working distances and magnification figures remain the same as on DX at 43.5cm, 34cm, and 0.14x respectively, and coverage is 1.5x greater in each dimension.

Barrel distortion has become more visible, but again chromatic aberration is negligible, and while the lens is very soft wide open, it is sharp right across the frame on stopping down to F5.6.

## Specific image quality issues

As always, our studio tests are backed up by taking hundreds of photographs with the lens across a range of subjects, and examining them in detail. This allows us to confirm our studio observations, and identify any other issues which don't show up in the tests. We tested the lens on both DX and FX bodies, ranging from the D90 to the top-of-the-range D3.

### Flare

The AF-Nikkor 50mm 1:1.4D shows generally good resistance to flare in normal shooting, and handles our 'real -world' flare test somewhat more elegantly than the Canon equivalent. With the sun placed in the corner of the frame, it shows a variety of flare patterns dependant upon aperture, but with a rather lower loss in contrast than the Canon (indeed at F5.6 the image is remarkably free of detrimental effects). However move the light source just outside the frame, and the image does exhibit an overall loss of contrast due to broad swathes of veiling flare.

F2.8, Nikon D3

F5.6, Nikon D3

F16, Nikon D3

F6.3, Nikon D3 (sun out of frame)

## Background Blur ('bokeh')

One genuinely desirable, but difficult to measure aspect of a lens's performance is the ability to deliver smoothly blurred out-of-focus regions when trying to isolate a subject from the background, generally when using a long focal length and large aperture. The 50mm F1.4 can be made to blur even relatively close backgrounds into oblivion at wide apertures, a huge advantage for portrait shooting especially on DX.

The bokeh produced by this lens is perfectly acceptable, although perhaps a little 'busy' even wide open, and not as smooth as can be achieved with a high quality 70-200mm F2.8, for example. Perhaps its strongest characteristic is the tendency for out-of-focus highlights to show up as heptagons due to the 7-bladed aperture, which gets more noticeable and potentially distracting the further the lens is stopped down.

F2.8, Nikon D3

F1.4, Nikon D3

50% crop, upper right

50% crop, upper left

## Chromatic aberration

Lateral chromatic aberration is negligible in our studio tests, and is equally near-impossible to find in real-world shots; quite simply it's not an issue when using this lens. What can be problematic, though, is the presence of quite strong bokeh chromatic aberration, which is most visible at wide apertures. This tends to show up as fringing around high contrast edges which is magenta in front of the field of focus and green behind; the latter can also be accompanied by a magenta 'fill'. Note that as this isn't lateral chromatic aberration, it can't be removed by the in-camera processing of the latest Nikon bodies (D3, D300, D700, D90), and is also difficult to deal with in software post-processing.

F1.4, Nikon D300


50% crop

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| F1.4, Nikon D3 | 50% crop |

Wide open, the 50m F1.4 also shows particularly strong blue fringing around in-focus high contrast edges; this is a halation effect which appears to be due to a combination of spherical aberration and axial chromatic aberration. This is particularly emphasized on DX cameras due to the extra effective magnification of the image, and again can't be easily corrected in post-processing. The effect reduces progressively on stopping down, with the width of the fringing approximately halving at F2, and disappearing completely at F2.8.

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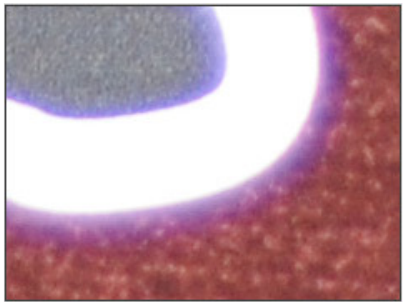
|  |  |
| F1.4, Nikon D300 | 100% crop, centre |

## Softness and vignetting at wide apertures

Our studio tests show that this lens is not at its best at wide apertures on full-frame; central resolution is relatively low, and the corners extremely soft and subject to significant darkening through vignetting. However in this regard it's also important to appreciate that with the extremely small depth of field afforded by a 50mm F1.4 lens, and assuming a reasonably centrally-placed subject, the likelihood of any object in the corners of the frame being remotely in focus is in fact minimal, and corner resolution therefore near-irrelevant.

The images below illustrate the lens's performance for those inclined to shoot flat subjects at wide apertures; at F1.4 the centre of the frame is simply soft, and in the corner little detail is visible at all, a situation exacerbated by strong vignetting reducing the overall contrast. However at F4, the corners have nearly caught up with the centre for sharpness, and vignetting has become insignificant.

| **F1.4** | **F4** |
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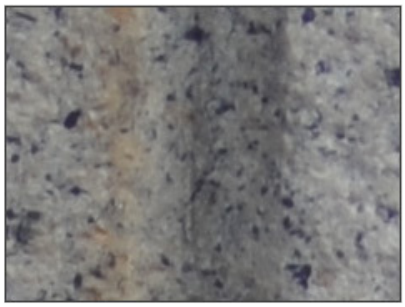
|  |  |
| Nikon D3, 1/8000 sec ISO 200 | Nikon D3, 1/1600sec ISO 200 |
|  |  |
| 100% crop, centre | 100% crop, centre |

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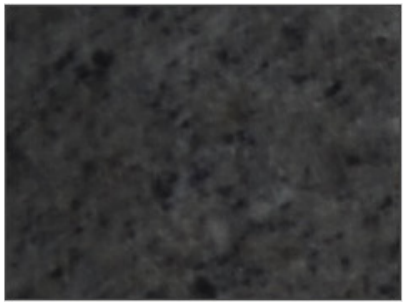
|  |  |
| 100% crop, top left corner | 100% crop, top left corner |