

Test sample:  
Nikon D3s camera test

#### Camera details:

The camera features 12 megapixel on a full format sensor, which is a comparably low pixel count and integration in the digital business. This enables enormous flexibility in dynamic range based specs, like ISO range. Input dynamic range or noise. Anyway, the available ISO range of 11 stops is stunning as well as its performance.

#### Coefficient of resolution:

SLR camera test marks are evaluated with a reference lens. Therefore specific resolution marks are not applicable in a SLR camera test.

#### Artefact rating:

The camera itself does not enhance fine detail contrast and compensates a lot of chrominance artefacts. This may affect fine chromatic detail accuracy, but improves graphical structure reproduction. Artefact rating is good to moderate: 2.5.

#### Dynamic ranges:

The low sensor integration supports an amazing performance in input dynamic. It can be seen clearly, that this camera has been designed for low to lowest light photography. At ISO 100 sensor over saturation is obvious, this speed is not recommendable. At ISO 200 absolute input dynamic range is best, but regarding relative performance the camera sports very good performance from ISO 200 to ISO 800 and excellent marks from ISO 1600 to ISO 102400. Output signal range is best at the high contrast ISO 100 setting and decreases constantly the higher ISO has been set. It provides good marks from ISO 200 to ISO 12800 and moderate marks at ISO 25600 and ISO 51200 and a restricted performance at ISO 102400.

#### OECF:

The tonal reproduction shown by the OECF function is very linear from bright image regions to darker regions. Just highlights and shadows are visibly softer. This strategy focus' more on accurate scene reproduction and studio use than on fast or press photography. Tonal reproduction is amazingly constant from ISO 200 to ISO 102400. Only at ISO 100 scene reproductions shows enhanced contrast from the brightest highlights on, a consequence of light over saturation at this ISO speed.

#### Noise:

The camera's noise reproduction strategy is very constant and shows almost constantly increasing noise according to ISO speed. At ISO 100 noise is extremely low over the full brightness range. From ISO 200 to ISO 6400 noise increases slowly, it remains almost constant at ISO 6400 and 12800, a sign for additional second level noise compensation. Over this ISO range luminance noise is only relevant with dominance in midrange to darker scene regions. Then low frequency chrominance noise increases visibly from ISO 12800, which starts in midrange to bright regions and is visible over the full brightness range from ISO 51200 on. The shadows show extremely low noise. Noise character is natural and consists of film grain like noise only.

#### Shadow noise compensation:

The camera's signal processing highly works on noise to improve shadow noise based test marks. The degree of compensation ranges from -75% at ISO 100 to -53% at ISO 102400.

This affects scene homogeneity visibly, as shadows seem more flat than image regions of slightly darker to midrange brightness. The total amount of scene information eliminated by shadow noise compensation is -11.9% a restricted mark.

#### Sharpening:

The camera's sharpening design is excellent. Due to the lower pixel integration there is very low need to compensate the lens' blur by internal algorithms. The degree of sharpening is low and very constant any any orientation. The distribution of sharpening over the brightness range is perfect as now highlight or shadow clipping occurs. Chromatic artefacts do not occur, a perfect pictorial result for flexible and sophisticated post processing.

#### Fine image details and artefacts:

The camera features a reduced low-pass-filtering design without frequency based contrast enhancement. To improve test marks, high frequency chrominance aspects are compensated, which may bias fine coloured details. Vertical and horizontal structures show virtually no chromatic artefacts and luminance Moiré. Slanted structures show visible luminance Moiré, chrominance Moiré occurs to a very low degree at rising diagonal structures only. Diagonal structures show no visible aliasing. This artefact rating is well to moderately suited to technical reproduction of textured image details.

#### Shutter delay:

Using the Nikon AF-S Nikkor 24-70 2.8 G ED lens, the camera shows the following results: passing the full focal range from infinity to our test distance, the camera shows good marks with a mean delay rate of 0.544 seconds. Under bright scene condition the auto focus is noticeably faster than under reduced illumination. Using the pre-focussed mode, the shutter delay provides very good marks and a delay around 0.078 seconds.

#### Conclusion:

The camera follows a very ambitious and courageous strategy: low pixel number at the benefit of enhanced dynamic range performance. It works well, as it proves outstanding performance in dynamic ranges and highest ISO speed noise. In addition tonal reproduction, sharpening and fine detail reproduction focus' much more on neutral and accurate scene reproduction than on crispy fast photography. The camera's results are an excellent source for flexible post processing. Some cheating can be seen by the enhanced shadow noise compensation, which leads to less noise homogeneity and by possibly chrominance loss, when fine chromatic structures are captured. Compression is recommendable at fine and standard setting, basic is not recommended. AF-speed is good, pre-focussed shutter delay is excellent.

At all a very powerful and ambitious camera which really widens the horizon of photography. A remarkable decision for less pixels and more flexibility.

**DCTau 5.0 SLR camera test**

Tested range: 11 ISO speeds

**1. Camera details**

Sample	Nikon D3s
Image width	4256 pixel
Image height	2832 pixel
File size, uncompressed	35313 kilobytes

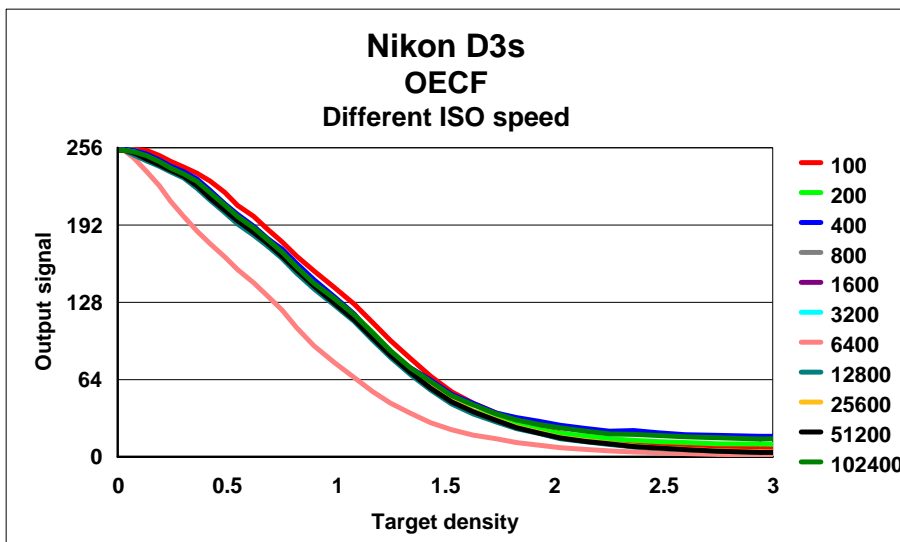
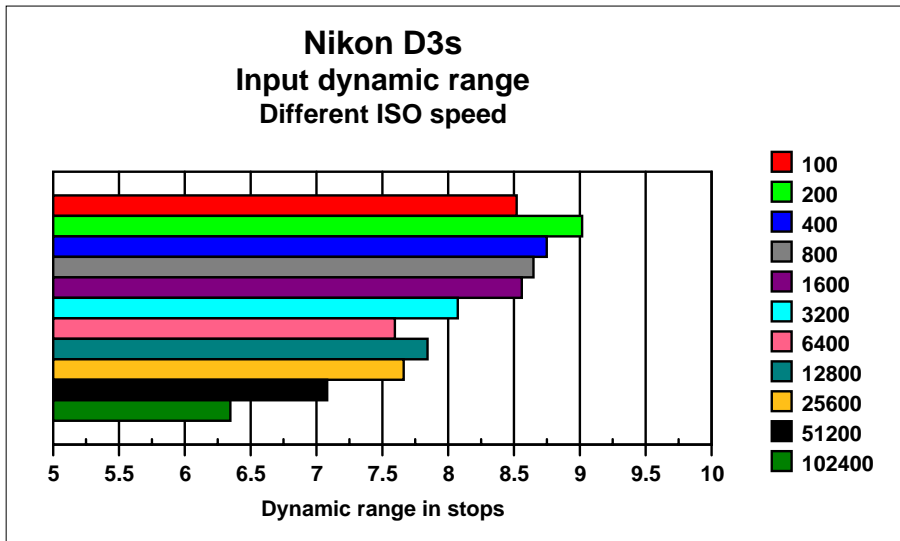
Compression resolution	quality	Bitmap file size	compressed file size	ratio
12 MP	fine	35312	3939	9
12 MP	stand	35312	2938	12
12 MP	basic	35312	927	38
6.5 MP	fine	19776	2384	8
6.5 MP	stand	19776	1769	11
6.5 MP	basic	19776	563	35

**2. Resolution aspects**

Artefact rating 2.5

**3. OECF**

<b>ISO speed</b>	<b>100</b>	<b>200</b>	<b>400</b>	<b>800</b>
Input dynamic range	8.5	9.0	8.7	8.6
Input density range	2.56	2.71	2.62	2.59
Highlight mark	254	254	254	254
Shadow mark	1.7	3.3	3.7	3.7
Output signal range	253	252	251	251
<b>ISO speed</b>	<b>1600</b>	<b>3200</b>	<b>6400</b>	<b>12800</b>
Input dynamic range	8.6	8.1	7.6	7.8
Input density range	2.57	2.42	2.28	2.35
Highlight mark	254	254	254	254
Shadow mark	4.8	4.0	5.8	4.8
Output signal range	250	251	249	250
<b>ISO speed</b>	<b>25600</b>	<b>51200</b>	<b>102400</b>	
Input dynamic range	7.7	7.1	6.3	
Input density range	2.30	2.12	1.94	
Highlight mark	254	254	254	
Shadow mark	6.2	8.3	14.8	
Output signal range	249	247	240	

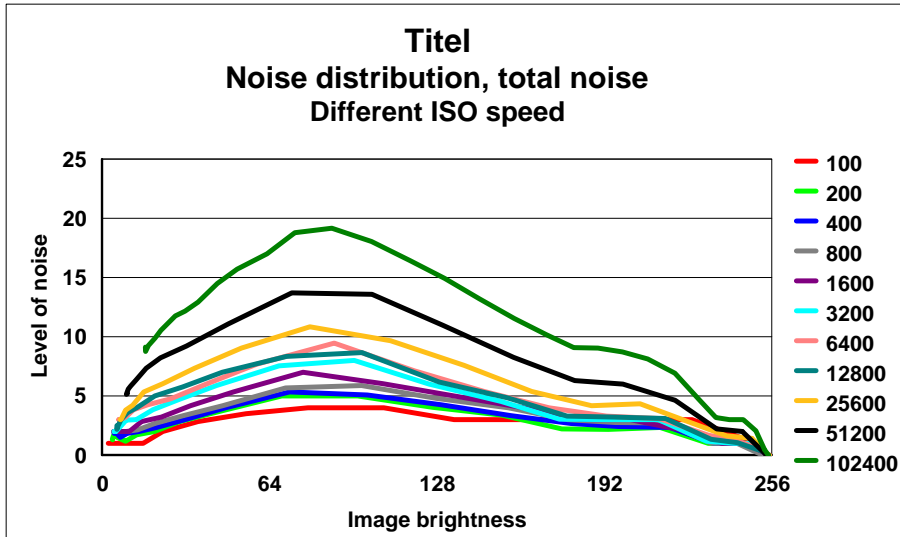
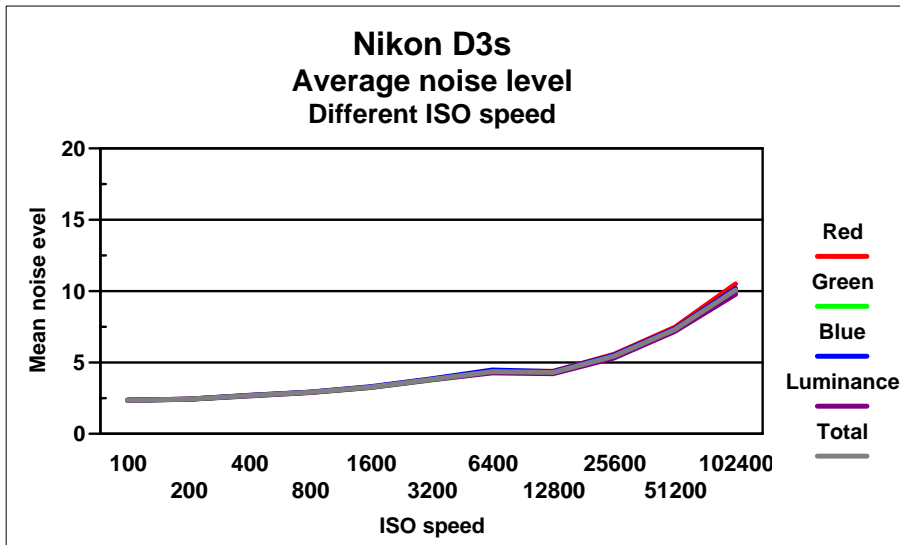


**4. Noise****Average noise level:**

<b>ISO speed</b>	<b>100</b>	<b>200</b>	<b>400</b>	<b>800</b>
Red	2.4	2.4	2.7	2.9
Green	2.3	2.4	2.7	2.9
Blue	2.4	2.4	2.7	2.9
Luminance	2.4	2.4	2.7	2.9
<b>Total</b>	<b>2.4</b>	<b>2.4</b>	<b>2.7</b>	<b>2.9</b>

<b>ISO speed</b>	<b>1600</b>	<b>3200</b>	<b>6400</b>	<b>12800</b>
Red	3.3	3.8	4.4	4.4
Green	3.2	3.8	4.3	4.3
Blue	3.3	3.9	4.5	4.4
Luminance	3.2	3.8	4.3	4.2
<b>Total</b>	<b>3.3</b>	<b>3.8</b>	<b>4.4</b>	<b>4.3</b>

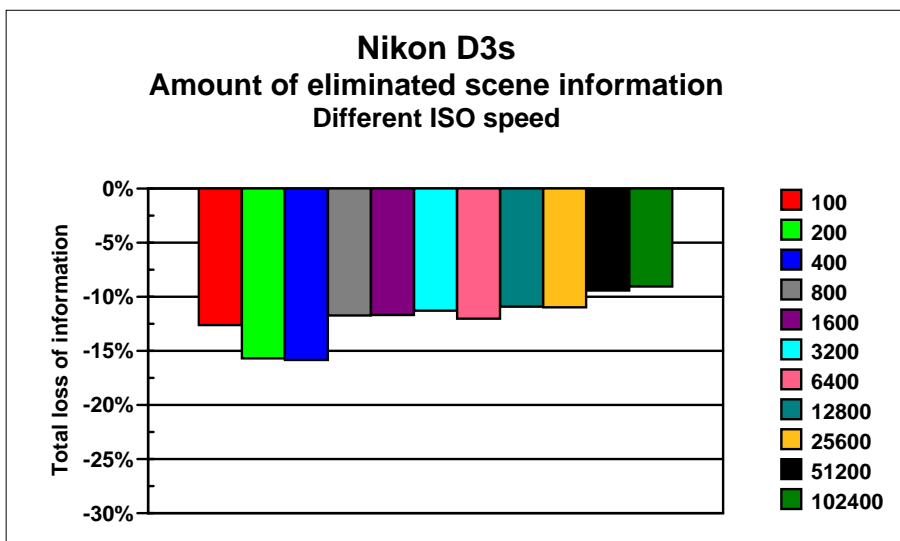
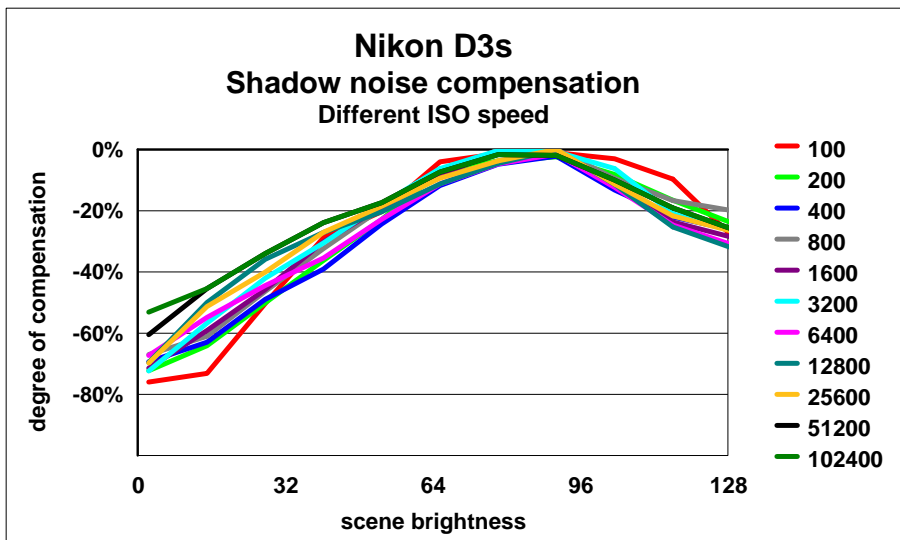
<b>ISO speed</b>	<b>25600</b>	<b>51200</b>	<b>102400</b>
Red	5.6	7.5	10.5
Green	5.4	7.2	9.9
Blue	5.5	7.4	10.2
Luminance	5.3	7.2	9.8
<b>Total</b>	<b>5.4</b>	<b>7.3</b>	<b>10.1</b>



**5. Shadow noise compensation**

<b>ISO speed:</b>	<b>100</b>	<b>200</b>	<b>400</b>	<b>800</b>
Brightness showing noise maximum:	83	89	98	87
Affected brightness range:	30%	35%	40%	30%
Amount of eliminated scene information:	-13%	-16%	-16%	-12%
<b>ISO speed:</b>	<b>1600</b>	<b>3200</b>	<b>6400</b>	<b>12800</b>
Brightness showing noise maximum:	88	85	91	90
Affected brightness range:	30%	30%	35%	35%
Amount of eliminated scene information:	-12%	-11%	-12%	-11%
<b>ISO speed:</b>	<b>25600</b>	<b>51200</b>	<b>102400</b>	
Brightness showing noise maximum:	91	87	85	
Affected brightness range:	35%	30%	30%	
Amount of eliminated scene information:	-11%	-9%	-9%	

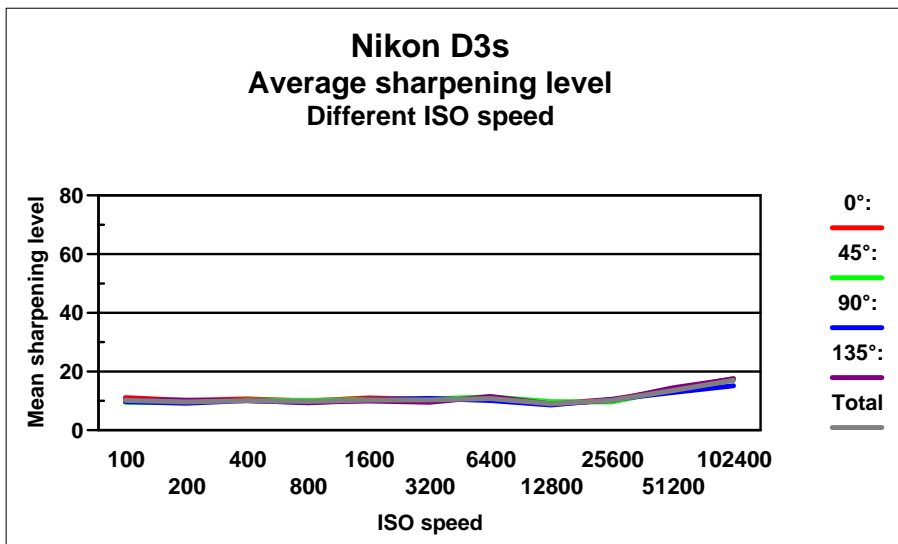
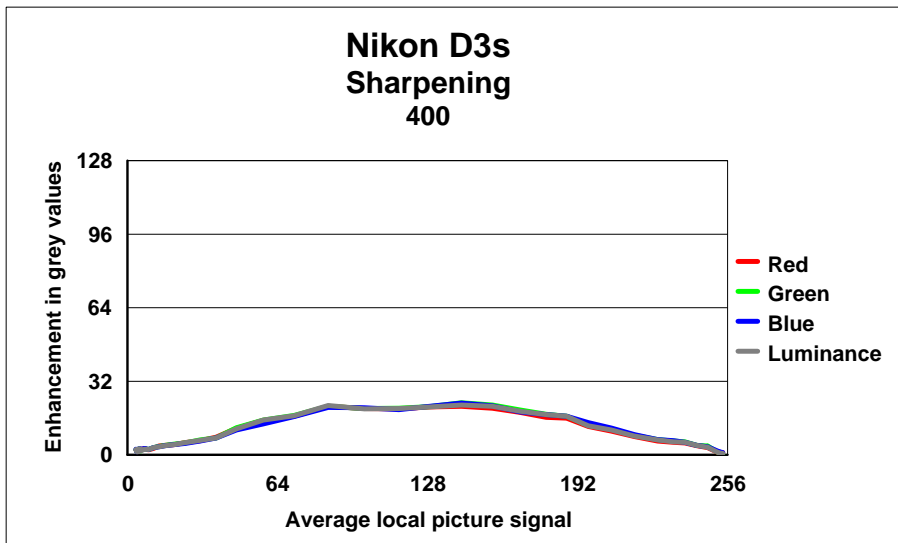
Mean mark of eliminated scene information: **-11.9%**



### 6. Sharpening

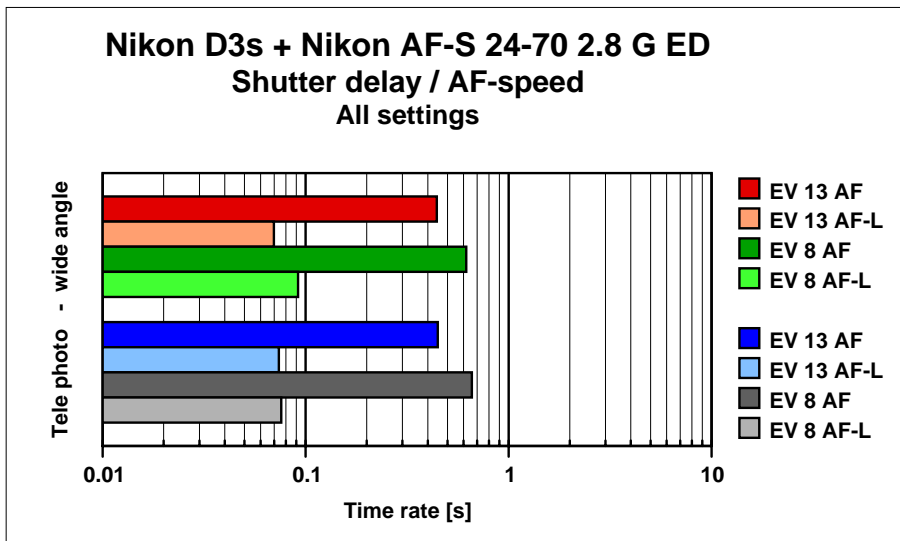
Mean sharpening level

0°:	10.6
6°:	9.9
45°:	10.3
90°:	10.1
96°:	9.4
135°:	10.0
Mean level, all directions	10.1



### 7. Shutter delay / AF-speed

Zoom position	Brightness	AF-Mode	Time rate [s]
Wide angle	EV 13	AF	0.444
		AF-L	0.070
	EV 8	AF	0.620
		AF-L	0.092
Tele photo	EV 13	AF	0.449
		AF-L	0.074
	EV 8	AF	0.661
		AF-L	0.076



### 8. Marks

These marks have been calculated for this camera-lens-combination. The range covers 0.5, best mark, to 6.5, worst mark. This represents 1.0=A to 6.0 =F in anglo-american marks.

	Mark:
Artefact rating:	2.5
Compression:	3.0
Input dynamic range:	1.1
Output signal range:	2.4
Noise:	0.6
Sharpening:	1.5
AF-Speed + shutter lag:	2.1
Shutter delay:	0.7