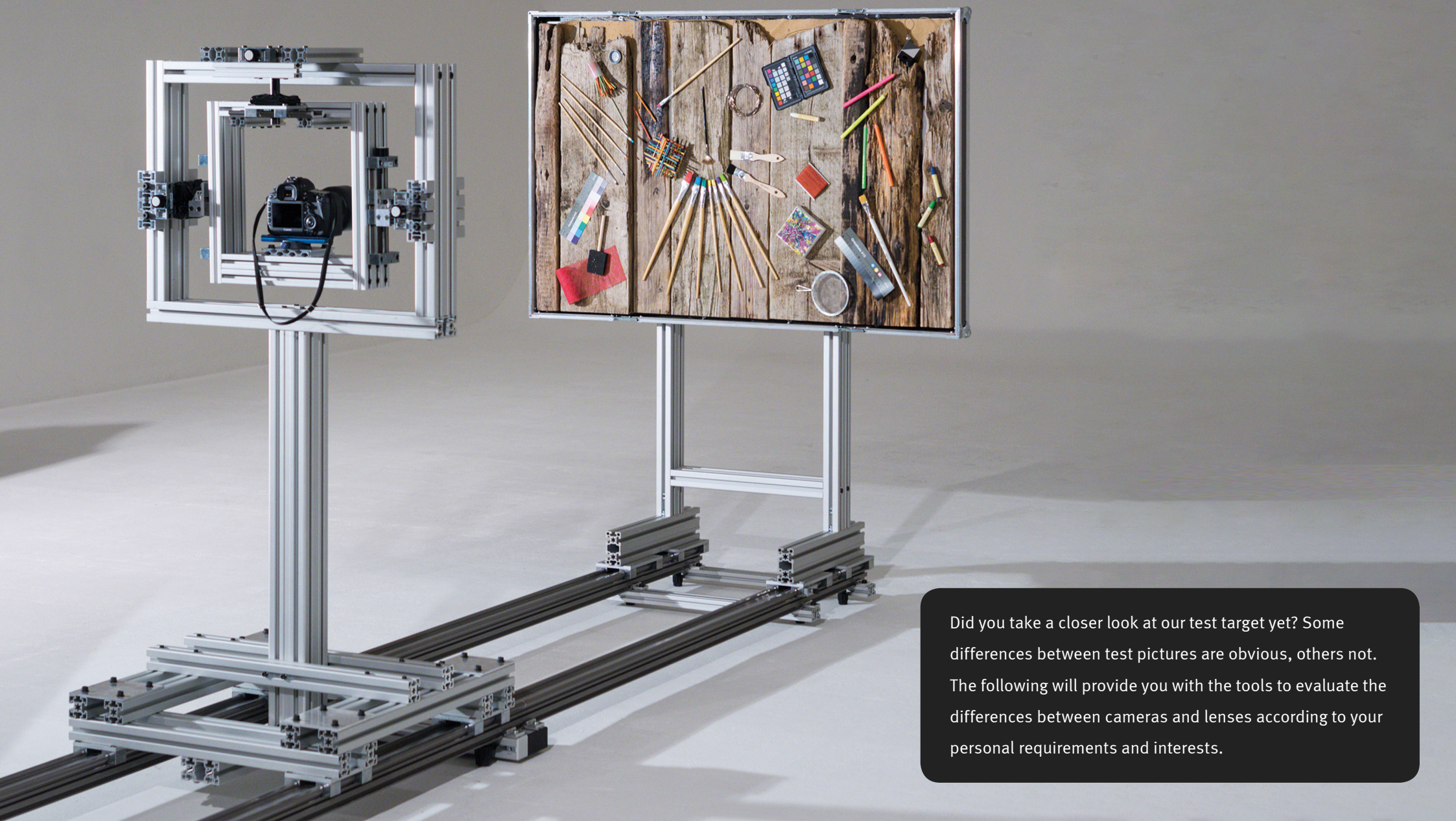
Trust Your Eyes

How to read Trust Your Eyes tests



Did you take a closer look at our test target yet? Some differences between test pictures are obvious, others not. The following will provide you with the tools to evaluate the differences between cameras and lenses according to your personal requirements and interests.

Color Checker

The color checker is a color reference target. It shows the effect of different sensor filter arrays but it is also a very good indicator for noise at high ISO settings. Plain monochromatic areas show noise much better than areas with detail and structure. Noise can as well appear with varying intensity depending on color tone or grey value.

Image center

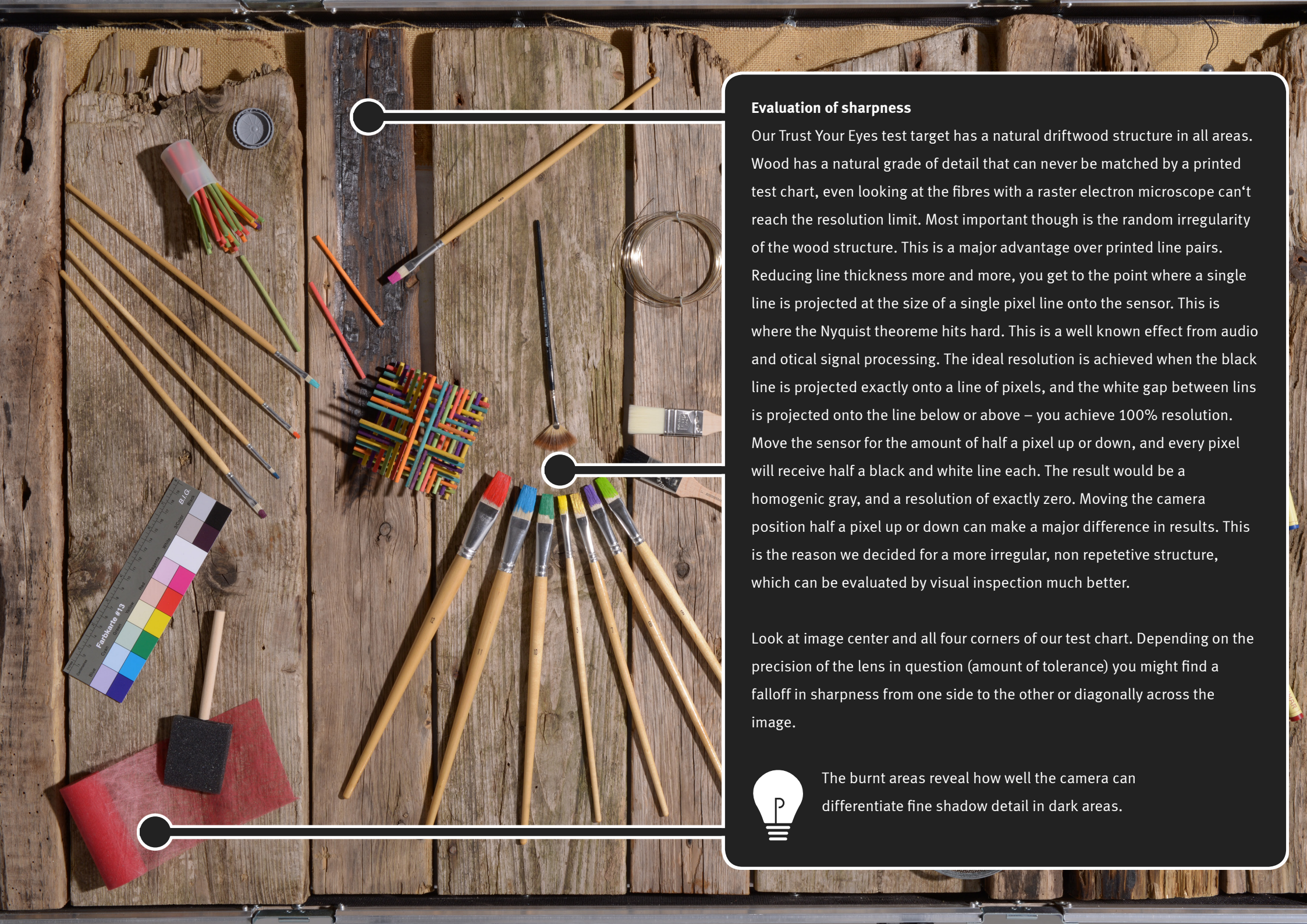
Our test target center shows a lot of fine detail in many different colors. The image is focussed on the brushes. This crop sample shows very well how sharp a lens is in the center of the image.

Cropped samples of the test target for the shopping guide

The shopping guide uses one of three cropped samples of the test images, the selection of the crop sample varies with the nature of the compared features.

Image corner

The barcode on the brush handle is a good indicator of lens sharpness in the image corners. Also, the contrast edges of the barcode typically display chromatic aberrations, if the lens is prone for that. They are easily spotted by magenta or green edges around the contour.



Evaluation of sharpness

Our Trust Your Eyes test target has a natural driftwood structure in all areas. Wood has a natural grade of detail that can never be matched by a printed test chart, even looking at the fibres with a raster electron microscope can‘t reach the resolution limit. Most important though is the random irregularity of the wood structure. This is a major advantage over printed line pairs. Reducing line thickness more and more, you get to the point where a single line is projected at the size of a single pixel line onto the sensor. This is where the Nyquist theoreme hits hard. This is a well known effect from audio and otical signal processing. The ideal resolution is achieved when the black line is projected exactly onto a line of pixels, and the white gap between lins is projected onto the line below or above – you achieve 100% resolution. Move the sensor for the amount of half a pixel up or down, and every pixel will receive half a black and white line each. The result would be a homogenic gray, and a resolution of exactly zero. Moving the camera position half a pixel up or down can make a major difference in results. This is the reason we decided for a more irregular, non repetetive structure, which can be evaluated by visual inspection much better.

Look at image center and all four corners of our test chart. Depending on the precision of the lens in question (amount of tolerance) you might find a falloff in sharpness from one side to the other or diagonally across the image.

The burnt areas reveal how well the camera can differentiate fine shadow detail in dark areas.

Skin tones

The driftwood on the Trust Your Eyes test target is very similar to human skin in color tone and saturation. Shifted colors are easily detected on this, as it is a color subconsciously very familiar to all of us. The color that you see in our preview crops and the crops used inside the shopping guide represent the Lightroom eyedropper tool interpretation of 50% gray on the color checker. A different raw converter might render different colors. Our full tests always contain the full raw files, so you can compare to your preferred raw converter.

When comparing raw converters, you should first disable the sharpening, which is often activated by default.

Vignetting and T-stops

Vignetting is an effect that leads to darker image corners, mostly with wide open aperture values. Stopping down greatly reduces this and makes the brightness more even across the image. To enable a fair comparison, it is imperative to guarantee a constant level of light on the test chart. We use a calibrated flash meter for this to maintain reproducable light intensities on target within 1/10 of an f-stop. If you come across a test image that is noticably darker wide open than one stopped down, this can be due to vignetting, but also due to transmission properties. The engraved f-stop is a calculated geometric value, and can be rounded up/down within certain limits. The transmission value though can be lower than the calculated geometric value. Cine lenses are engraved with t-stops instead of f-stops for that reason.

Differences in the backgound picture

Top image without vignetting

Bottom image with vignetting

Lens Distortion

The silver frame of our test target makes it easy to detect barrel distortion or pincushion distortion of a lens. Barrel distortion will bend the frame towards the outside of the image area, pincushion distortion will bend it inwards. Many modern cameras will correct that already in camera, applying the correction to OOC jpegs when a known lens is recognized. This makes up for the absence of optical correction, hiding what the lens capabilities really are. Some lenses will make the camera embed opcodes into EXIF data, and Lightroom (maybe others as well) apply corrections to RAW images based on those, even when you expressively deactivate corrections. Test that compared to your favorite RAW converter yourselves. Trust Your Eyes!

Without distortion

Pincushion distortion

Spherical projection (Fisheye)

Barrel distortion

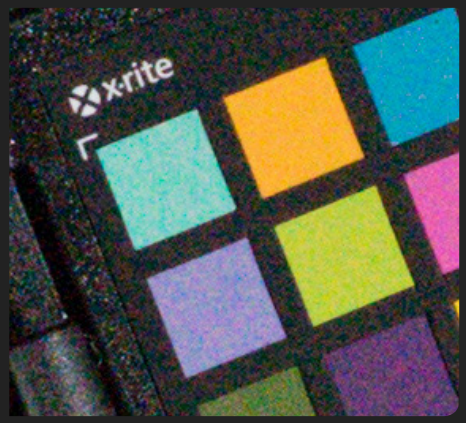
Chromatic Aberrations

Chromatische aberrations typically show on hard contrast edges and fine, contrasting lines. The enormous contrast of direct flash reflected from the metal shafts of the brushes in the middle of our test chart is a brilliant indicator for these. Green and magenta seams show most intense with the lens wide open.

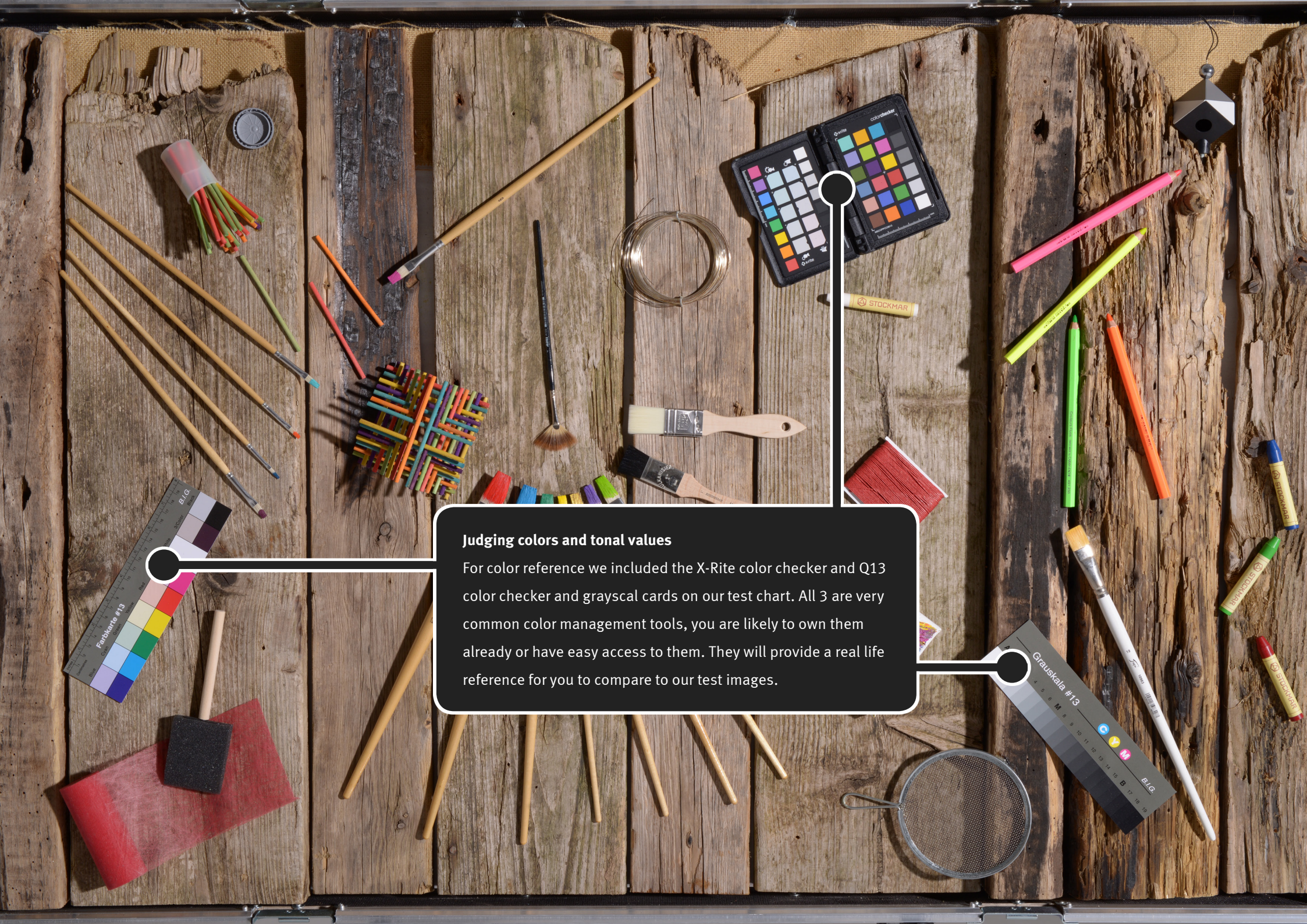
Noise performance

The noise performance of a camera body is most apparent on homogenous neutral or single color planes without much structure. Look closely at the color swatches on the color checker in the top right quadrant of our test chart. While noise shows very obvious in high ISO settings, it is revealing to use the eyedropper tool on neighboring pixels of a single color area. Cameras with larger pixels usually show smaller color variations from pixel to pixel compared to cameras with smaller pixels. The more pixels per area you squeeze onto a sensor, the stronger the noise usually shows. There are other reasons for noise in construction differences, but they typically have less influence compared to pixel count/pixel size. This examination should be performed on the RAW files, because the Jpeg algorithm reduces similar colors to single colors in blocks. This is also one reason why Jpegs are not as good as source for image manipulation, compared to uncompressed file formats. Event though noise seems uncritical and rather irrelevant in low ISO settings, it will be amplified when stronger image manipulations take place, like shadow boosting, chroma keying, grading with image looks.

Noise performance (Low)



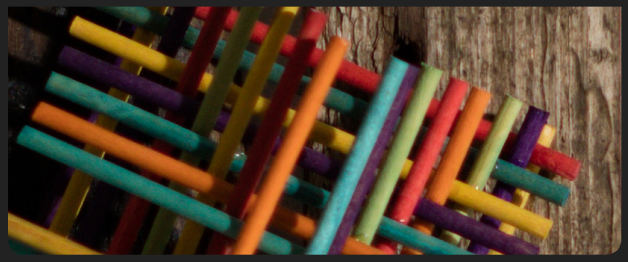
Noise performance (High)



Judging colors and tonal values

For color reference we included the X-Rite color checker and Q13 color checker and grayscal cards on our test chart. All 3 are very common color management tools, you are likely to own them already or have easy access to them. They will provide a real life reference for you to compare to our test images.

The pyramid gives you an idea how fast the unsharpness progresses when the aperture is wide open.



The black trap insode the SpyderCube represents the darkest spot in our test images.

The gouache pens show the rendition of saturated elementary RGB colors from deep shadow to specular highlights.

The white brush shows tonal separation in bright tones.

The color crayons show fluorescent color rendition. Fluorescent colors are extremely hard to reproduce by digital imagers.

The dark sponge bottom left shows fine detail in dark tones.

The red net bottom left shows fine structures in saturated reds.

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