Test of the Canon CN-E 30-300mm T2.95-3.7 L SP Zoom (PL mount)

by

Alfonso Parra AEC

TABLE OF CONTENTS

1 -Introduction 3

2- Resolution/Sharpness 4

3- Color. Chromatic Aberrations 13

4- Geometric and Perspective Distortions.
Out of Focus (Bokeh) 18

5- Light Uniformity. Vignetting 25

6- Flare and Veiling Glare 29

7- Conclusions 33

Introduction

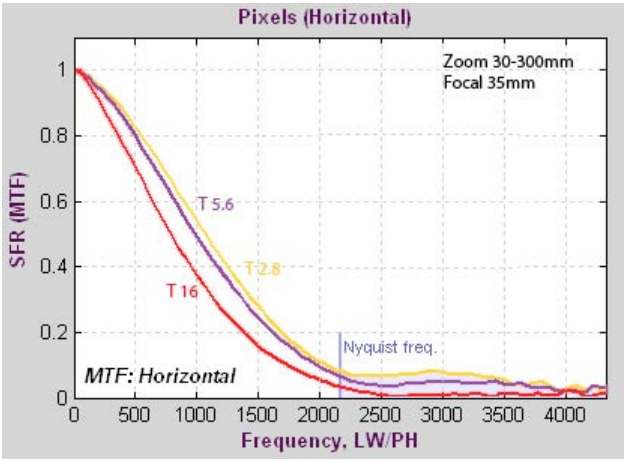
As a Director of Photography, my intention has been to reach a broad vision about the operation of the Zoom throughout the test. I have checked both objective elements and subjective ones. Objectives have been resolution, contrast or color analysis trough Imatest and ImageJ programs. After having seen the different frames, I have checked subjective elements like general evaluation of the image, focusing on its texture and appearance. In order to do the test we have used the different lenses which we will enumerate below, moreover we have also used the Red Epic camera and the new Canon EOS C500 PL, both of them at 4K format. We have basically used the first camera to see resolution and sharpness of the lenses, meanwhile we have used the second one to shoot in outdoor locations and the "Ucronías" short-film, as well as to evaluate the flare. We have recorded images from the C500 on a Codex, transferring from the Canon raw to the DPX and Prores 4444 1920x1080. The evaluation of the images from outdoor locations was generally made with a BaseLight, working at DPX 16 Bits with projection on 2K. To analyze the resolution of the Epic camera, we have extracted frames with RedCineX-Pro at Tiff 16 bits format.

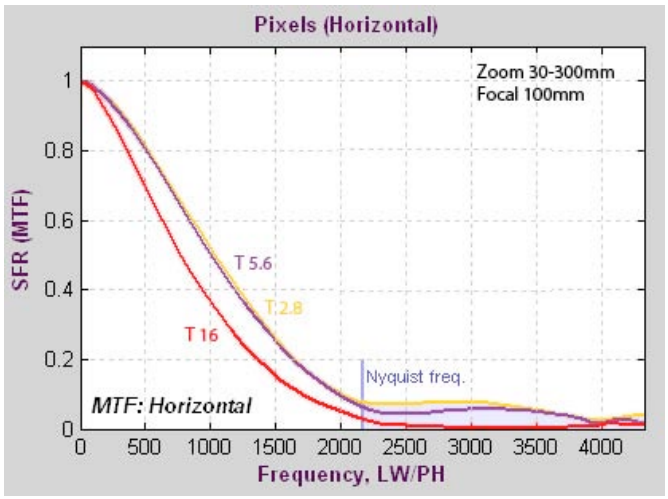
Frames from the article are used merely as a reference to show the tested images; they do represent truly in any way neither the resolution nor the color of the original because we have compressed them.

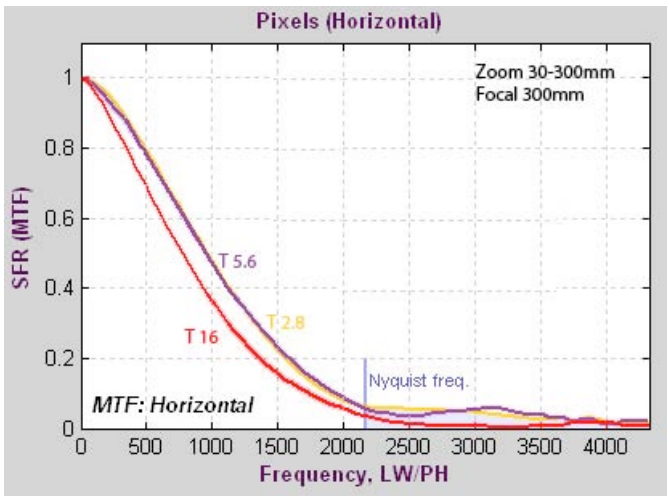
Resolution

As always, and since being a Director of Photography, I am interested in knowing the image resolution regarding all of the elements involved in its creation, such as lenses, sensor, electronic processing, different displays, etc. This is the reason why the values that we show in the article are only relative; they are used as comparative ones, on the one hand to evaluate the consistency of the Zooms among the different focal lengths, on the other hand to compare them with other lenses in order to know where the lens series are placed. To check lens ability for the resolution, we have worked with the EPIC camera, and with the C500, both of them at 4K format. We have made the charts processing through RedCineX-Pro, exporting 16 bits without compression. The questions that we would like to answer in this section are: Does the resolution keep constant with every lens? Does the resolution keep if the diaphragm changes with every lens? And, what is the resolution that Zoom shows in comparison with lenses by other manufacturers?

To answer the first and second questions we have photographed a 12232 ISO resolution chart and a Putora chart, placed on both in the center and on the periphery. We have chosen three focal lengths of the Zoom: a wide-angle, an intermediate and one more telephoto. With regard to the T values, we have also used a wide, an intermediate, and a narrow one. As we can see on the curves, responses of the three lenses are practically equal; we can only see a loss of resolution owing to the diffraction effect at T16. This resolution, similar with every lens, gives to the Zoom a great consistency to handle the sharpness.

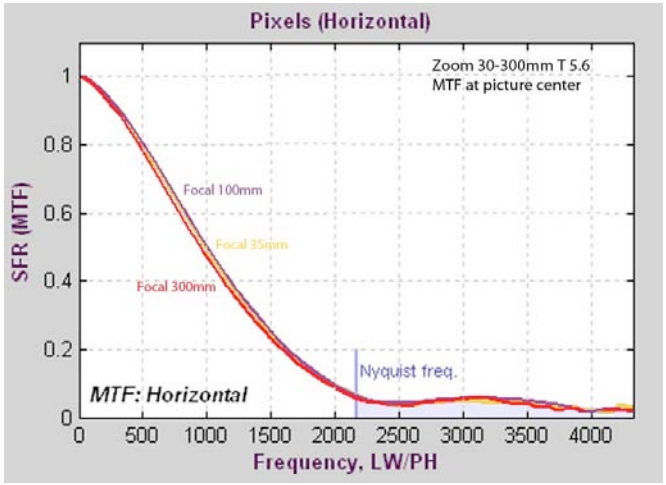


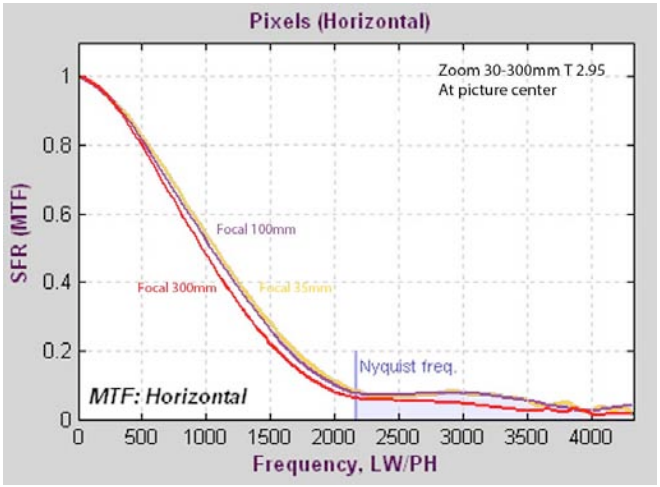




Focal	T stop	Horizontal Resolution (Lw/Ph) 50% at picture center
35mm	2.95	**1066**
35mm	5.6	981
35mm	16	791
100mm	2.8	**1030**
100mm	5.6	1002
100mm	16	772
300mm	3.7	963
300mm	5.6	948
300mm	16	772

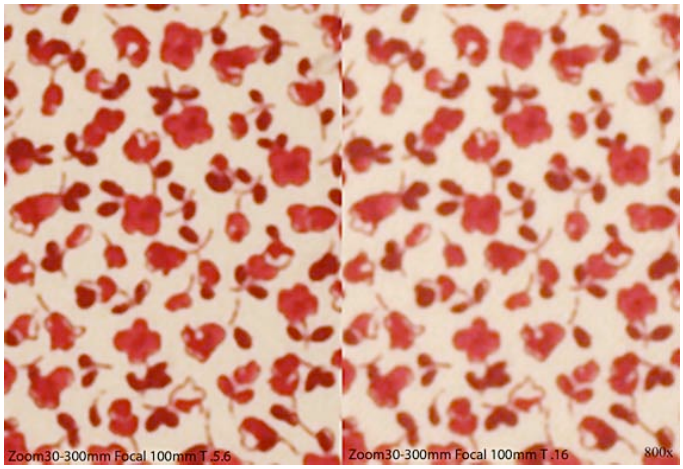
On the left, we show a table with results with the different lenses at different diaphragms. It should be pointed out that the 300mm lens at more open T gives a bit less resolution than the other lenses we have chosen, that is, we got 1030 Lw/ph and 1066Lw/ph with the 100mm and 35mm respectively, whereas it is 963Lw/ph with the 300mm. Despite the 300mm lens shows a bit less resolution, difference is not significant regarding the rest of lenses.

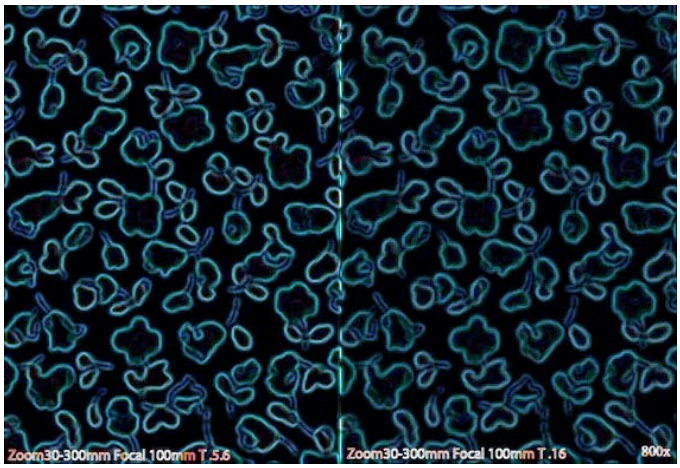




On the left graph, we compare the MTF curve with three different lenses, 35mm, 100mm and 300mm, each one of them at the same diaphragm value, T5.6. As we can see, differences are quite small; it is slightly smaller with the largest telephoto. On the right graph, we compare again the MTF curve with the same lenses, but at an open T, 2.95. We can observe a larger loss of resolution with the 300mm lens. We have photographed our Prêt à Porter fabric chart to see these small variations.

As example, the loss of resolution with the 100mm lens at T16. This is common throughout the Zoom range.

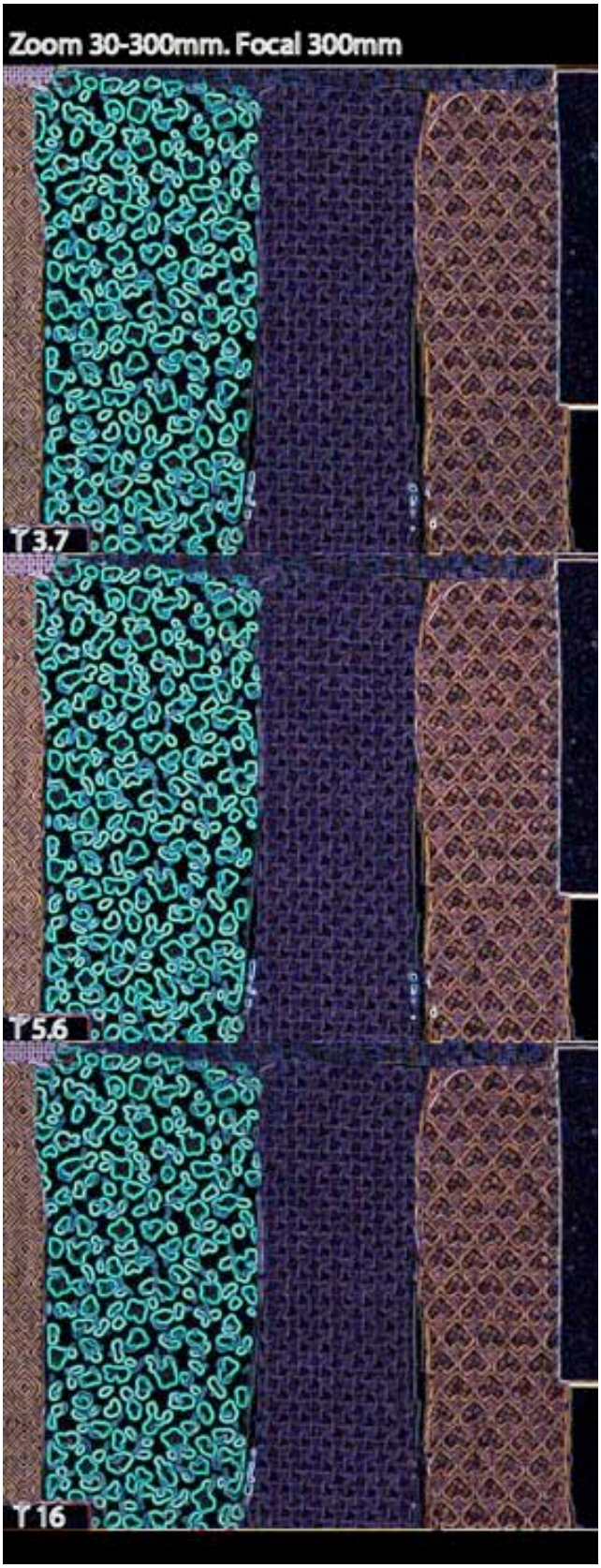


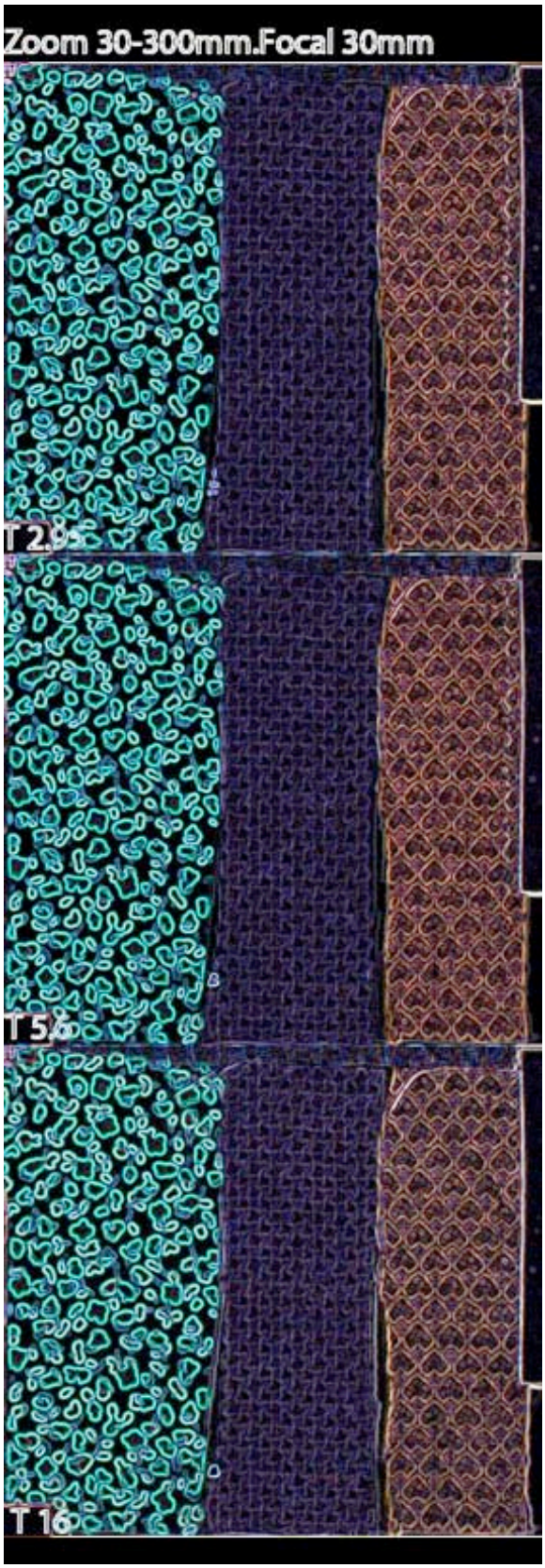


On the above image, we can see how sharpness of the flowers is lower with the T16 diaphragm than at T5.6. I have enlarged the image 800x.

Next, we show the comparison between the most extreme lenses. As we can see, they are practically identical; however there is a slight loss of sharpness with the 300mm lens regarding the 30mm.

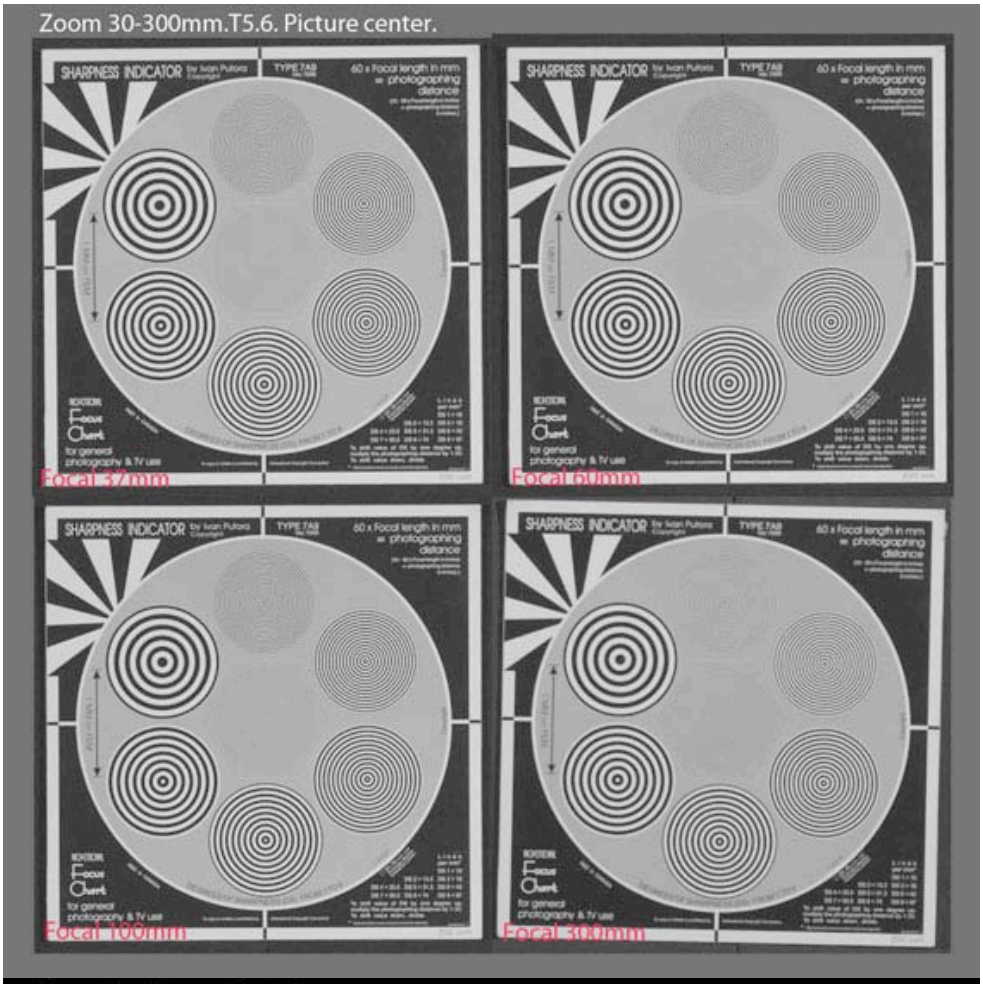
Next, we did the edge detection on the previous images to see much better the small difference between the most extreme focal lengths.

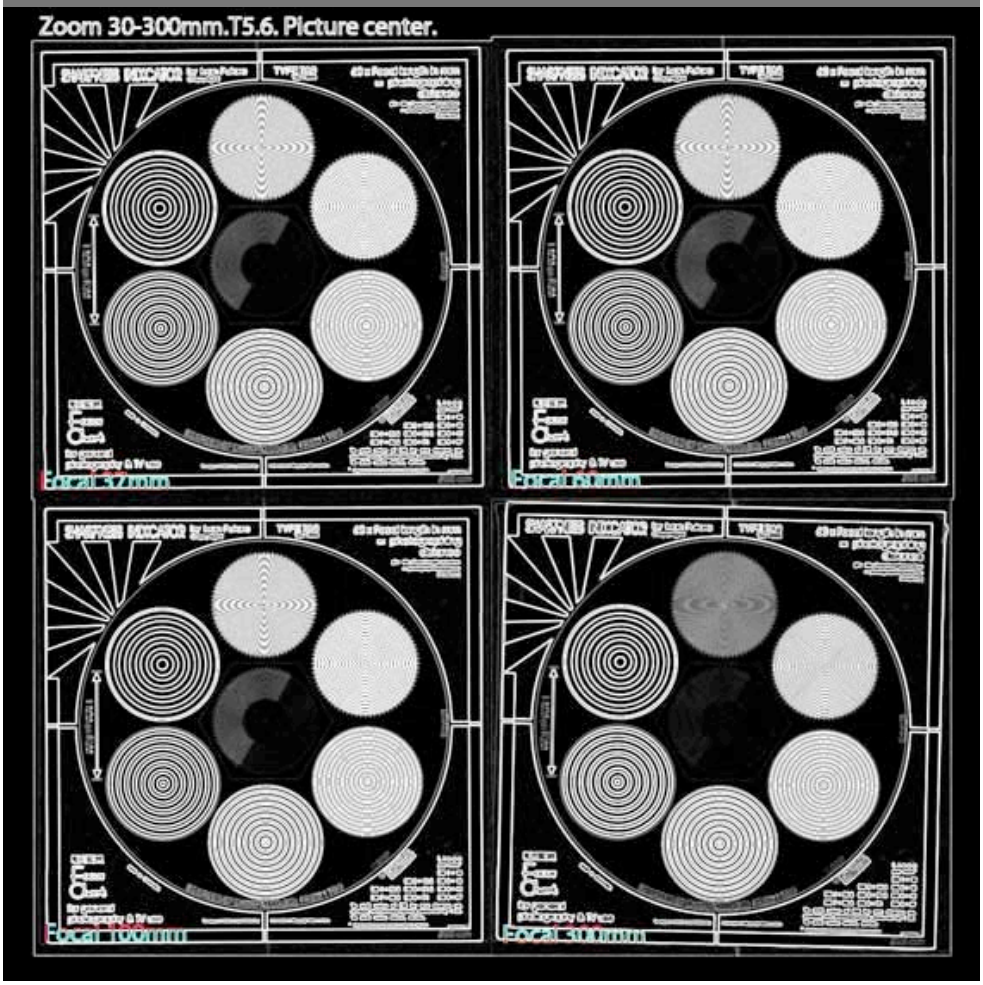




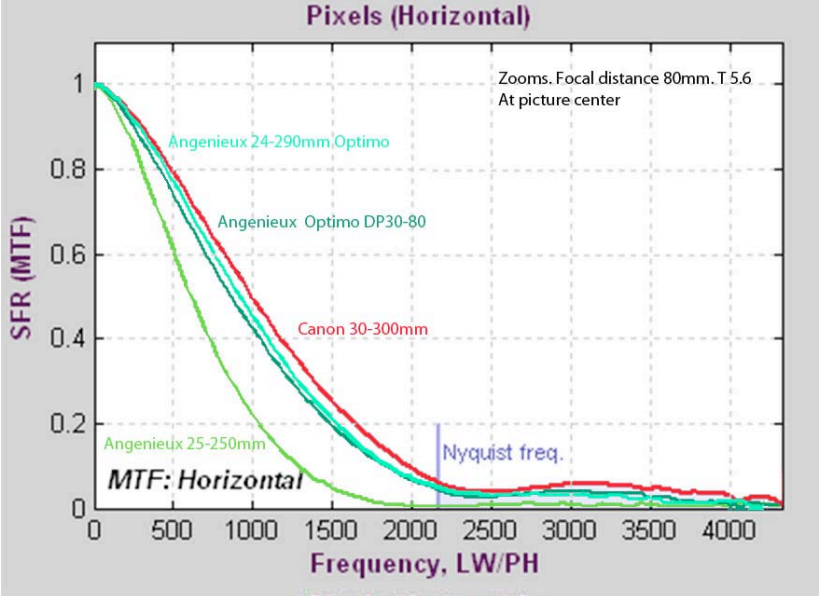
We can again observe this difference when we have photographed our Putora chart. Meanwhile we have evaluated the difference of resolution on the corners and side, we have seen that this is small, above all at such T as 5.6; behavior all over the surface is really good, although the loss of brightness on the sides affects also to the loss of contrast over them, as we are going to check later.

.


Zoom 30-300mm.T5.6. Picture center.
SHARPNESS INDICATOR
Focal 37mm
Focal 60mm
Focal 100mm
Focal 300mm


Zoom 30-300mm.T5.6. Picture center.

We can conclude from the chart evaluation that the resolution is very consistent, on both the center and the periphery, throughout the lenses range. At T-values between 4 and 11, the sharpness on the center and periphery is uniform at every focal length, and from T16 values, we can see the diffraction effect. These differences are practically not significant when we are shooting far from the world of charts, as we can check on the "real" frames that I show below. Nevertheless, before checking it, I would like to answer the third and last question that we have put above, in other words, where we do place the lenses within the market regarding the resolution. So, with no other intention that showing more clearly where is placed the resolution of the Zoom, I have compared with other of Angeniux manufacturer, including an old zoom like the 25-250mm. As we can see, resolution of the Canon Zoom 30-300 is even slightly higher than what provides the great Zoom Optimo 24-290mm.

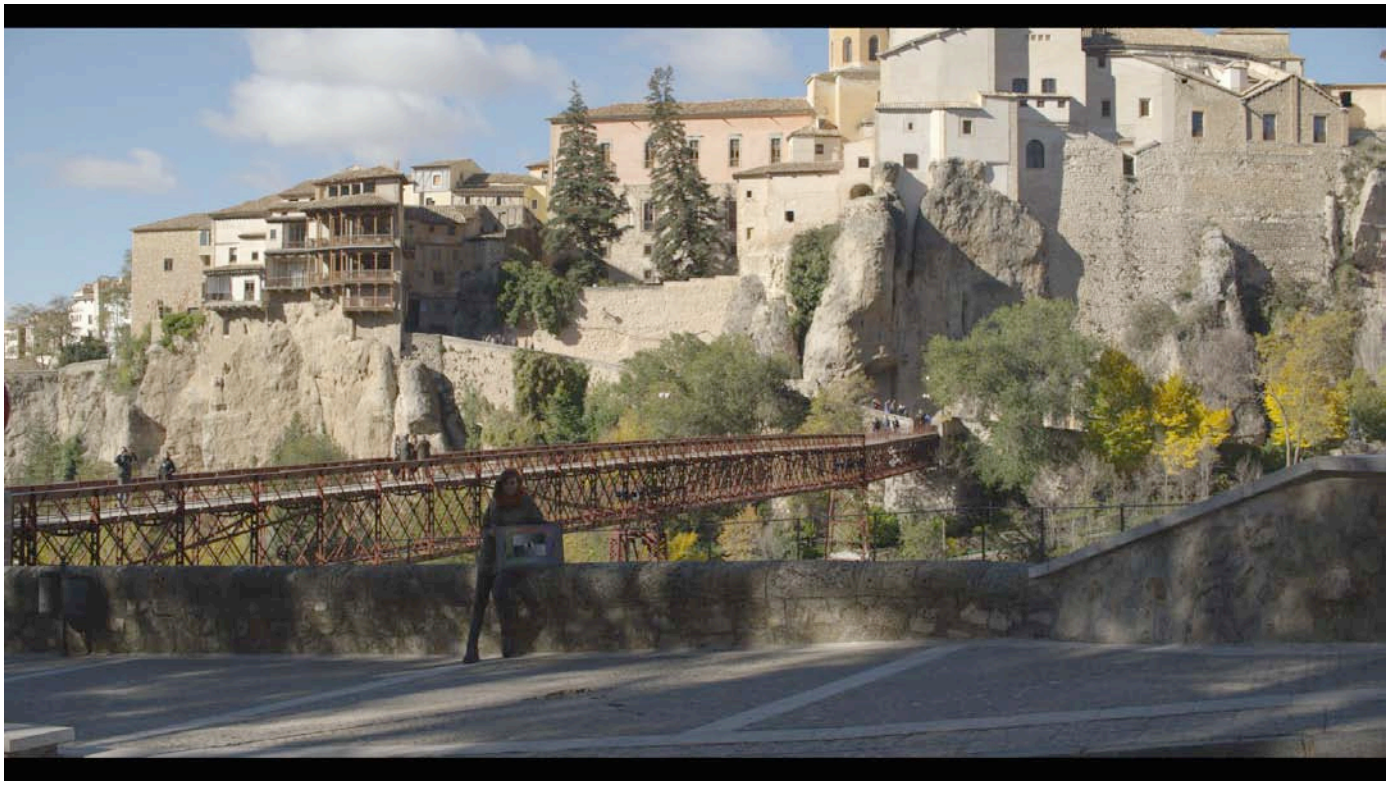


Next, let us see some frames from images in both outdoor and indoor locations, on which we can see the sharpness and contrast of the image.

Ventano del Diablo. Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180°. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Lens 30mm T 4.7 ND from camera 6 Stops. Graded

We can see on the frame the good definition that lens does; we can distinguish clearly vegetation and the texture of limestone, as well as the mountain outlines against the sky. Limits are clear and definite.

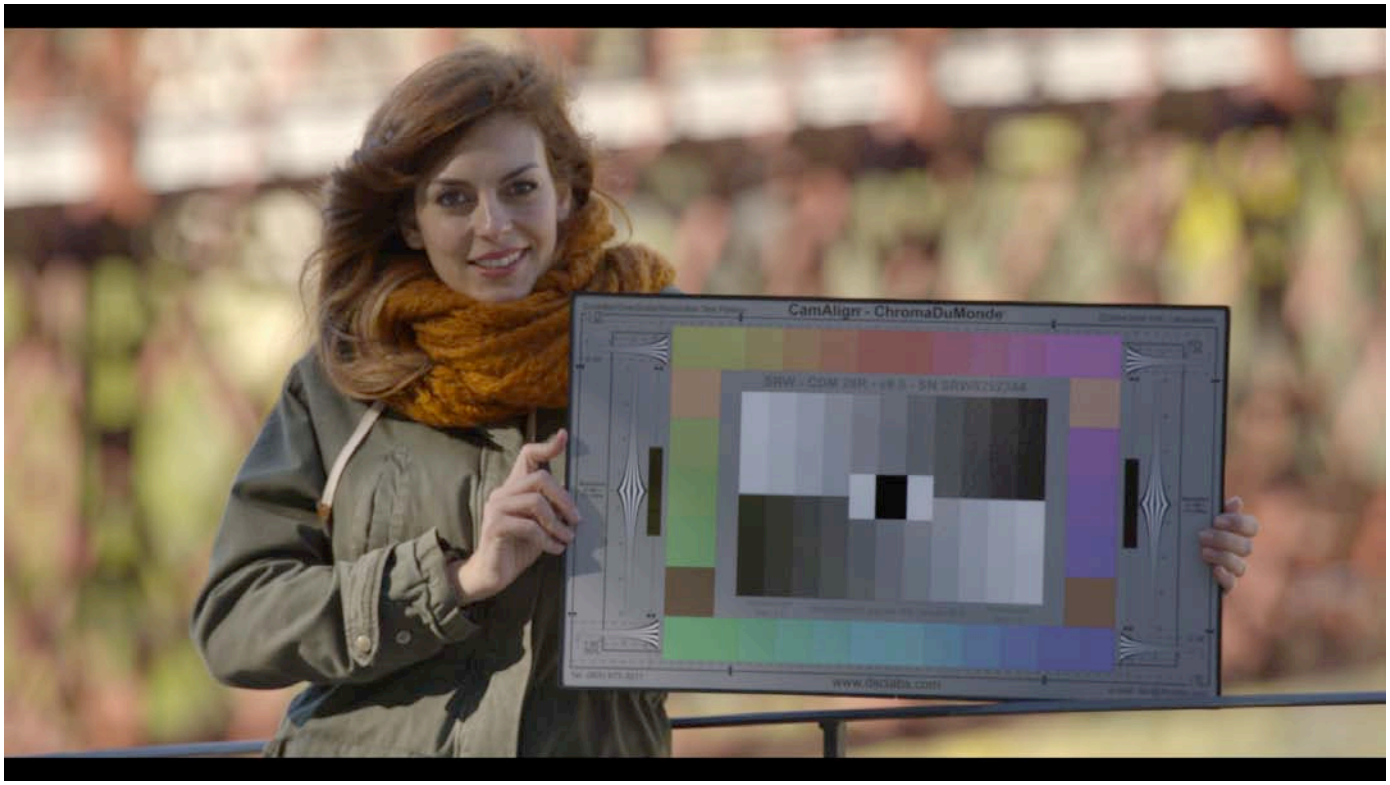
On the next four images, we can see how the sharpness, detail and texture are kept at different focal lengths. We especially have to point out the model's hair and the texture of her scarf, as well the texture of the stone.



Cuenca (Spain) from El Parador. Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180° . Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 30mm T 6.3 ND from camera 4 Stops. Without grading.

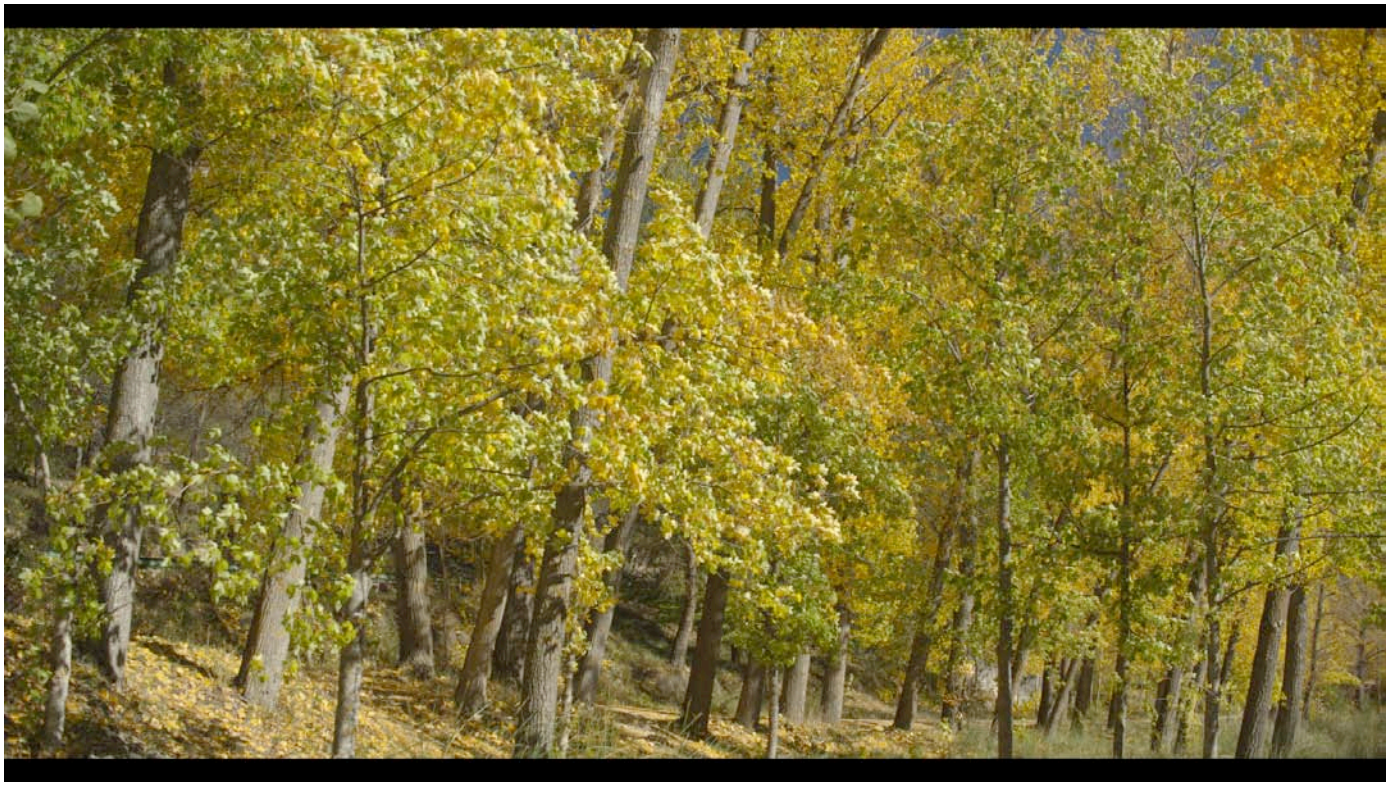
Cuenca (Spain) from El Parador. Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180° . Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 85mm T 6.3 ND from camera 4 Stops. Without grading.

Cuenca (Spain) from El Parador. Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180° . Gamma y Matrix Canon Log.
Zoom CN-E 30-300mm. Focal length 200mm T 2.95. ND from camera 4 Stops. Without grading

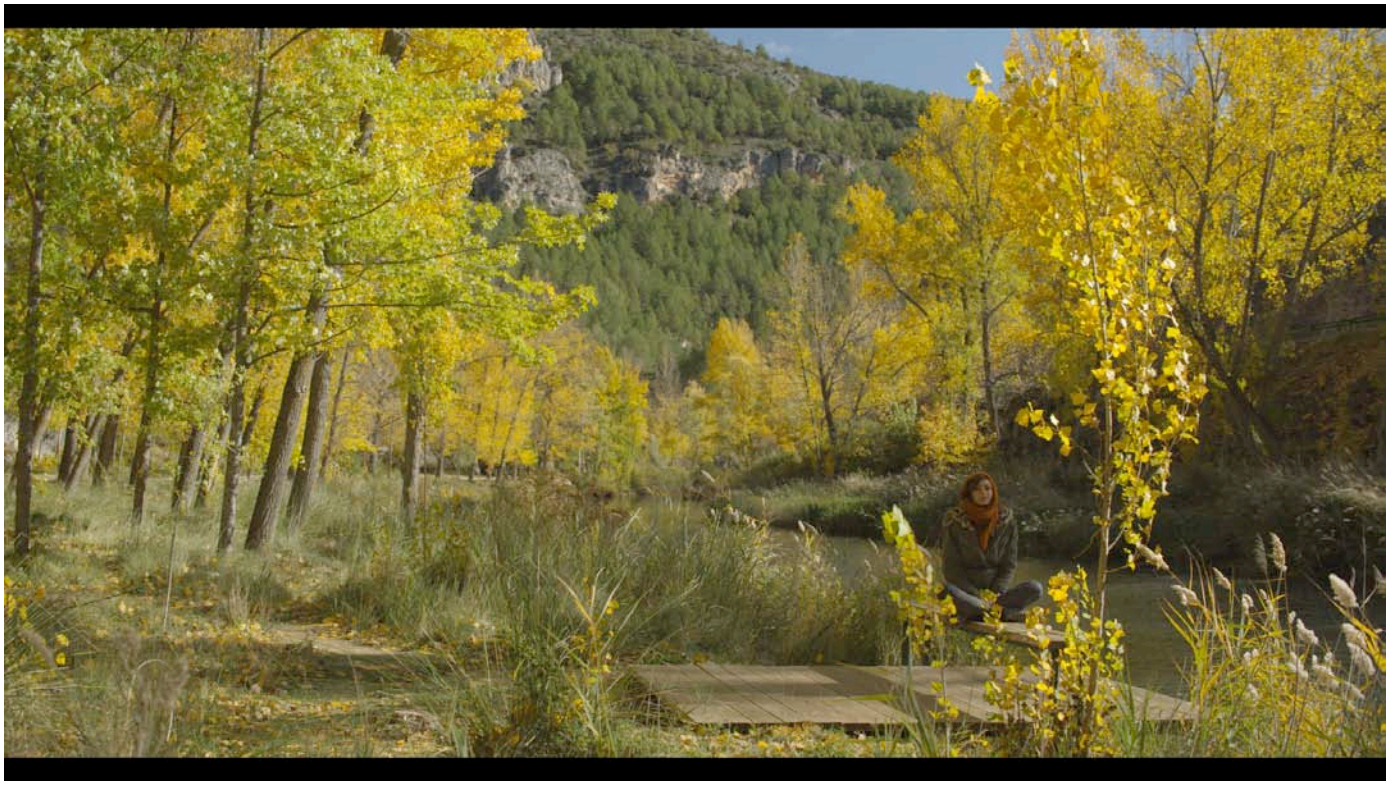


Cuenca (Spain) from El Parador. Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180° . Gamma y Matrix Canon Log.
Zoom CN-E 30-300mm. Focal length 300mm T 2.95. ND from camera 4 Stops. Without grading

Finally, two more frames of the Júcar river banks, which are the beginning and end of a panorama, on which we can see the excellent detail among the masses of leaves and the bark trees.



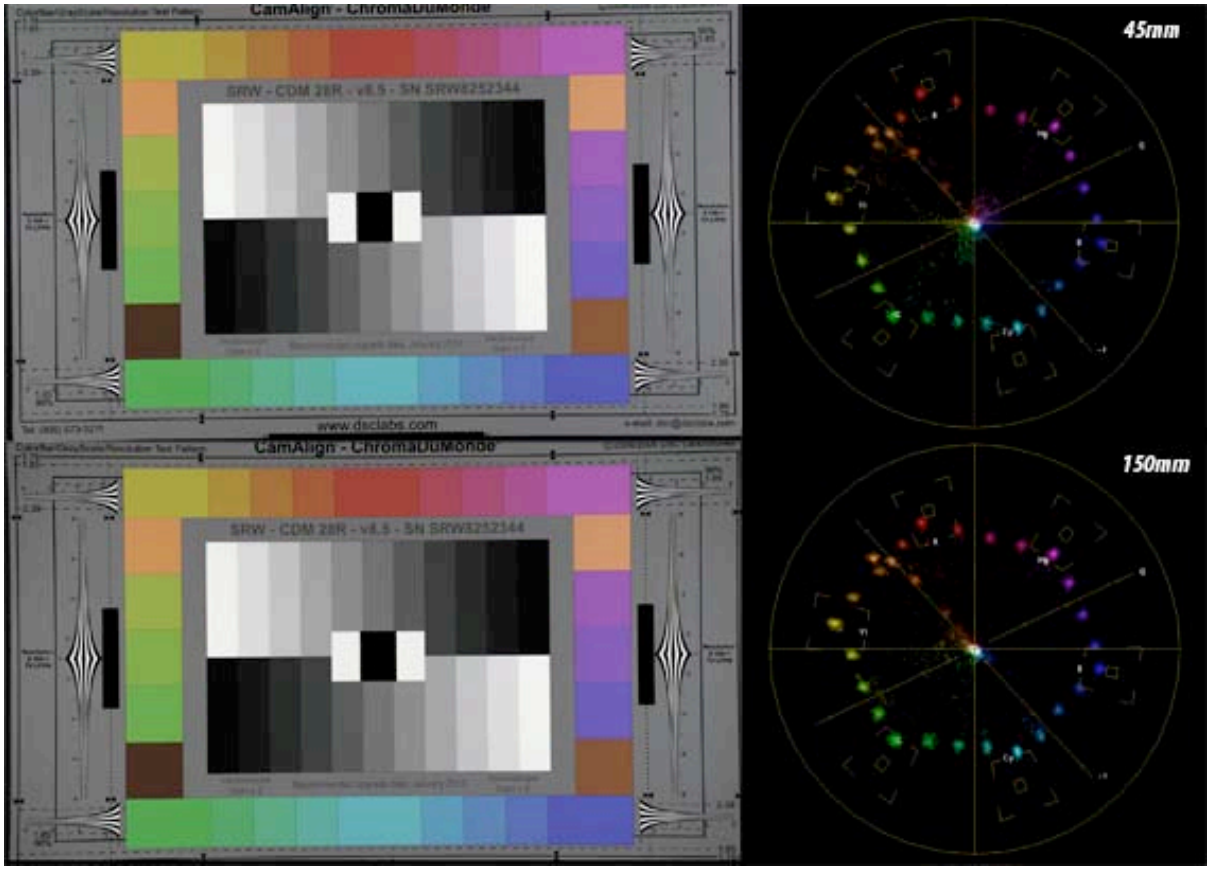
Hoz del Júcar. Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º . Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 30mm T 4. ND from camera 4 Stops + Polarizing. Without grading. Beginning of the panorama which ends in the next frame



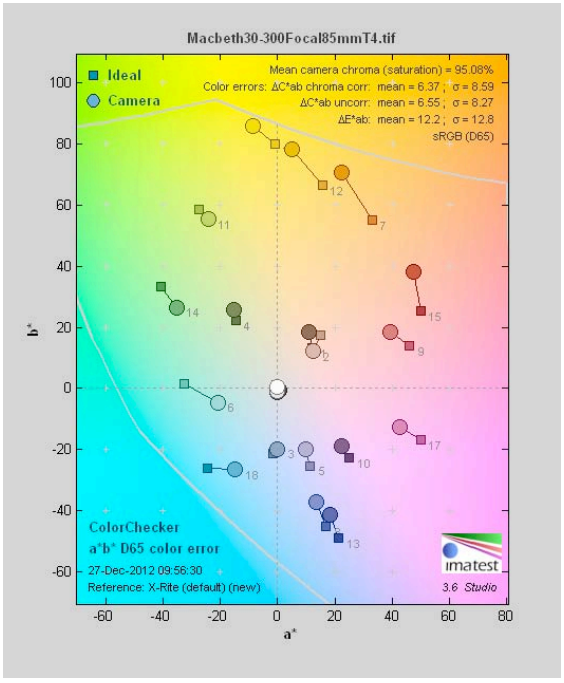
Hoz del Júcar Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º . Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 30mm T 4. ND from camera4 Stops + Polarizing. Without grading

Color

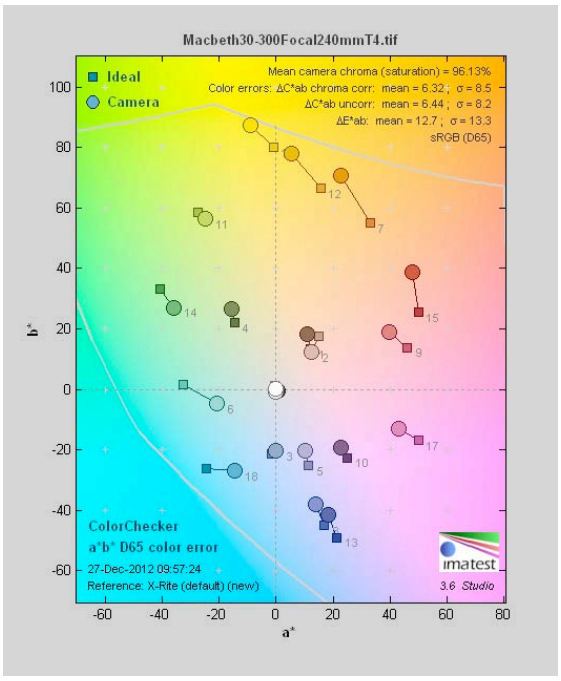
We have photographed the Chroma Du Monde and Macbeth charts to check the color consistency with every lens, as well as the hue caused by lenses. With regard to the color consistency; it should be pointed out that color is identical throughout lens rang. As an illustration, we suggest the two next charts.



We have practically got same values with the Macbeth chart analyzed through Imatest.



Focal length 85mm



Focal length 240mm

It should be pointed out that the Zoom seems neutral regarding its hue because of the lens. We can see neither deviation to warm tones nor to cold ones; colors keep natural. In this regard; we can say that the lens is "transparent". We show these frames as well as our work with them in postproduction in order to observe the excellent color reproduction.

Hoz del Júcar Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º . Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 30mm T 4 Neutral from Camera 4 stops + Polarizing. Graded

Next, a frame from the actress Ana Risueño's close-up. We can see the excellent behavior of the lens regarding the skin tone, when we have brought together natural and fluorescent light.

Ucronías. Canon C500+Codex - 4K (4096x2160)– Raw 10 bit- Iso 850 - 24 fps – 172.8º . Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal Length 85mm T 5.6. Filter Classic Soft 1.Graded.

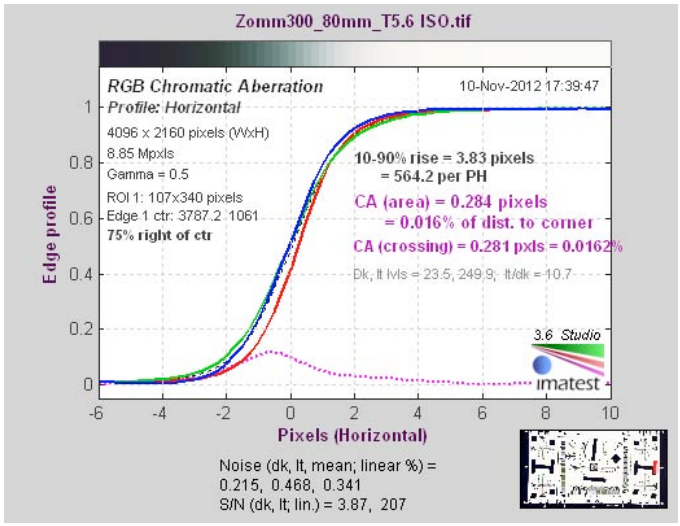
Finally, a frame of our model in outdoor location. We can also see the beautiful blurred background.

Viewpoint, Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 240mm. T 2.95 Neutral from Camera 4 stops. Graded

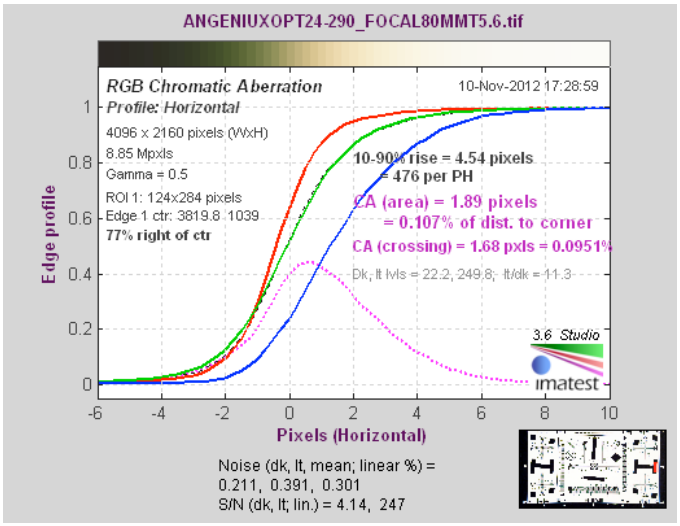
Chromatic Aberration

Firstly, to observe the chromatic aberrations we have photographed our ISO chart; then we have checked results through Imatest. The area value of CA is 0.284 as compared with 1.76 pixels provided by the Canon Zoom 14.5-60mm. This value is exceptionally low, what allows us to say that the Zoom is practically free of chromatic aberrations, since we have hardly been able to see them on our Via Stellae, which we show below.

If we compare the Imatest graph from the Zoom, for example, with the Angenieux Optimo 24-290mm, we can clearly see the difference.



Canon 30-300mm. Focal length 80mm T 5.6



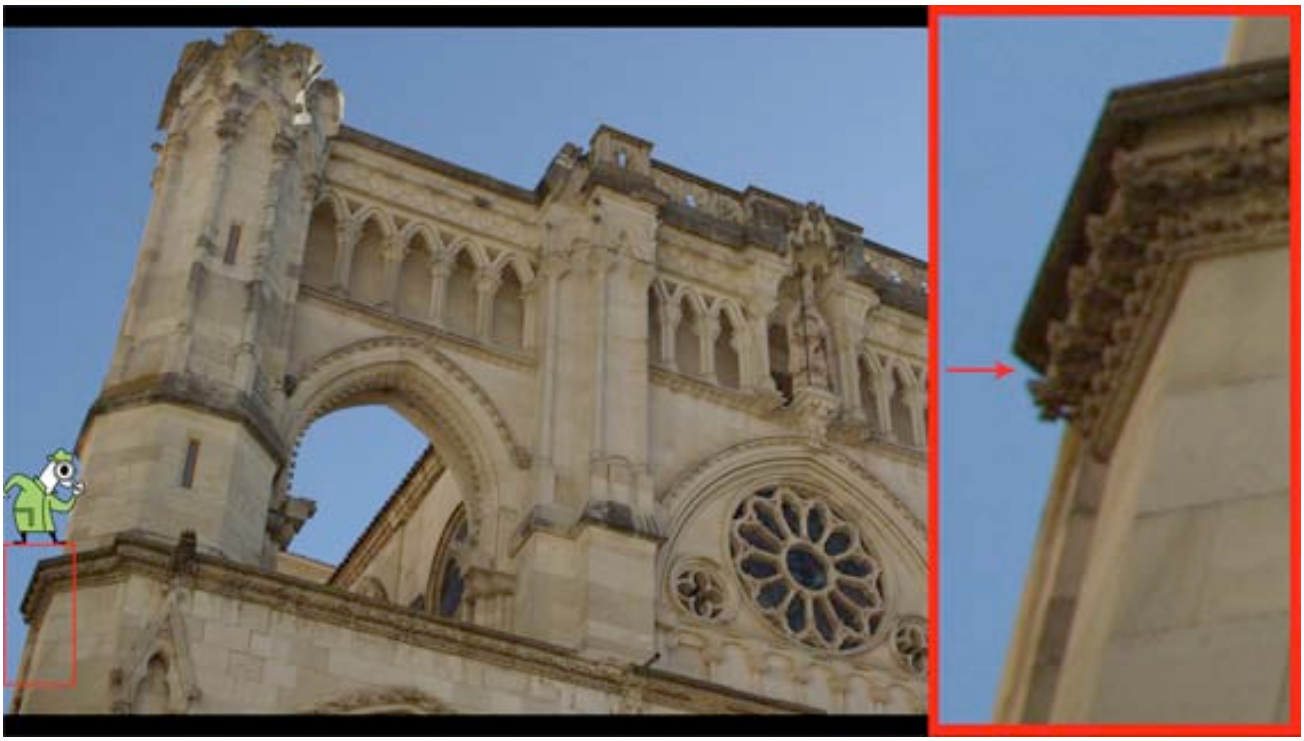
Angenieux Optimo 24-290mm. Focal length 80mm. T 5.6

I have saturated colors in the punch-hole chart to see more clearly this aberration.

Focal length 100mm

Focal length 240mm

As we can see on the next frame of Cathedral of Cuenca (Spain), we can hardly see this aberration on images from both outdoor and indoor locations.



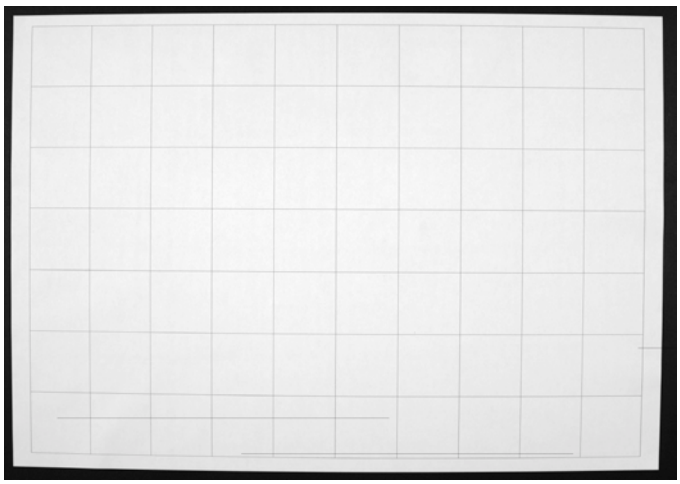
Cathedral of . Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. CN-E 30-300mm. Focal length 30mm T 5.6. ND from camera 6 Stops. Graded

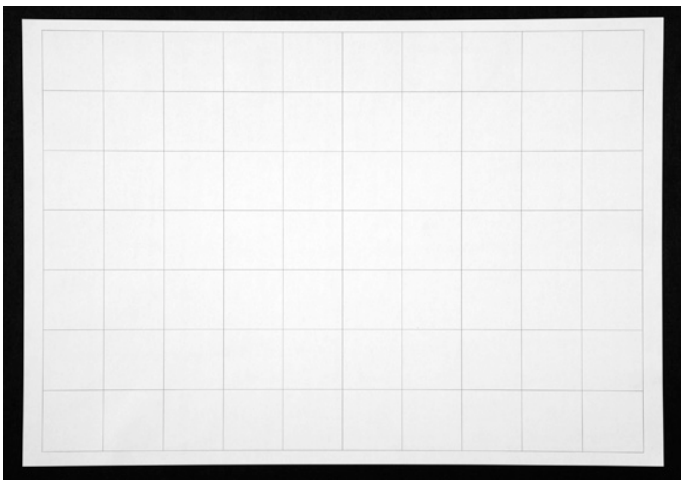
The aberration is typical and visible, above all, in digital formats. However, we can say that the lens corrects exceptionally well the aberration. Let us observe the next frame, in which we literally have to look carefully for the aberration (magenta/cyan) on the outline of pine top and trunk.

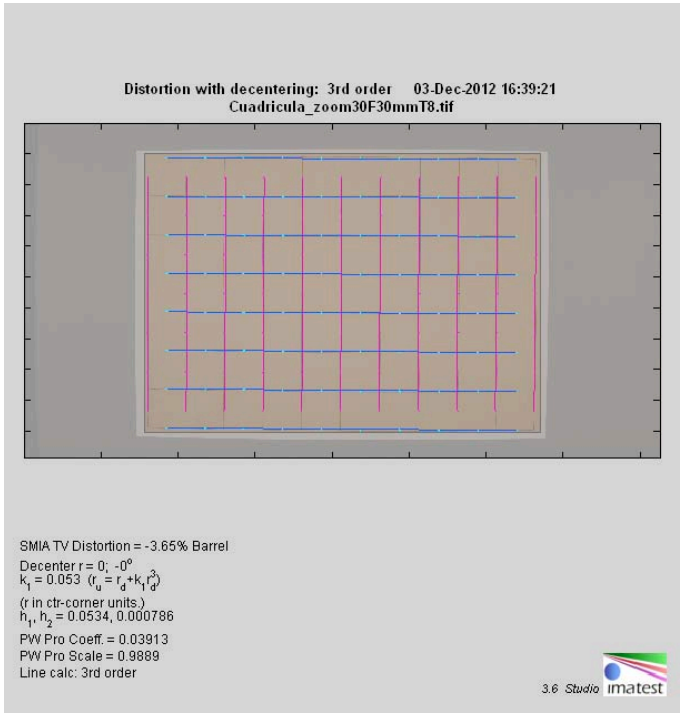
Ventano del Diablo. Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 300mm T 4.7 ND from camera 6 Stops. Graded

Geometric Distortion

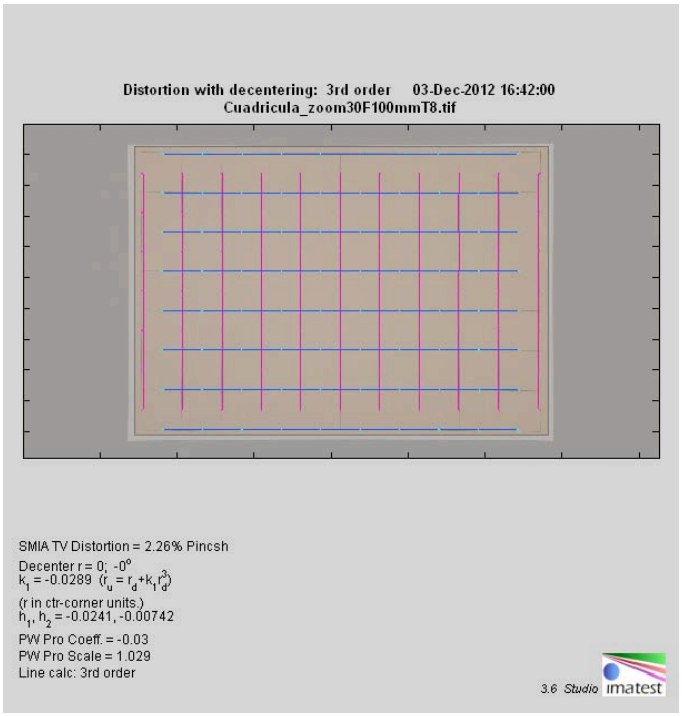
To evaluate the distortion, we have analyzed a graph paper through Imatest program, as well as frames from outdoor locations. Next images show distortion with two different lenses of the Zoom through Imatest; they are in SMIA* TV. SMIA value is different from the traditional definition by television industry –SMIA distortion value is twice as much as the traditional one.







Focal length 30mm

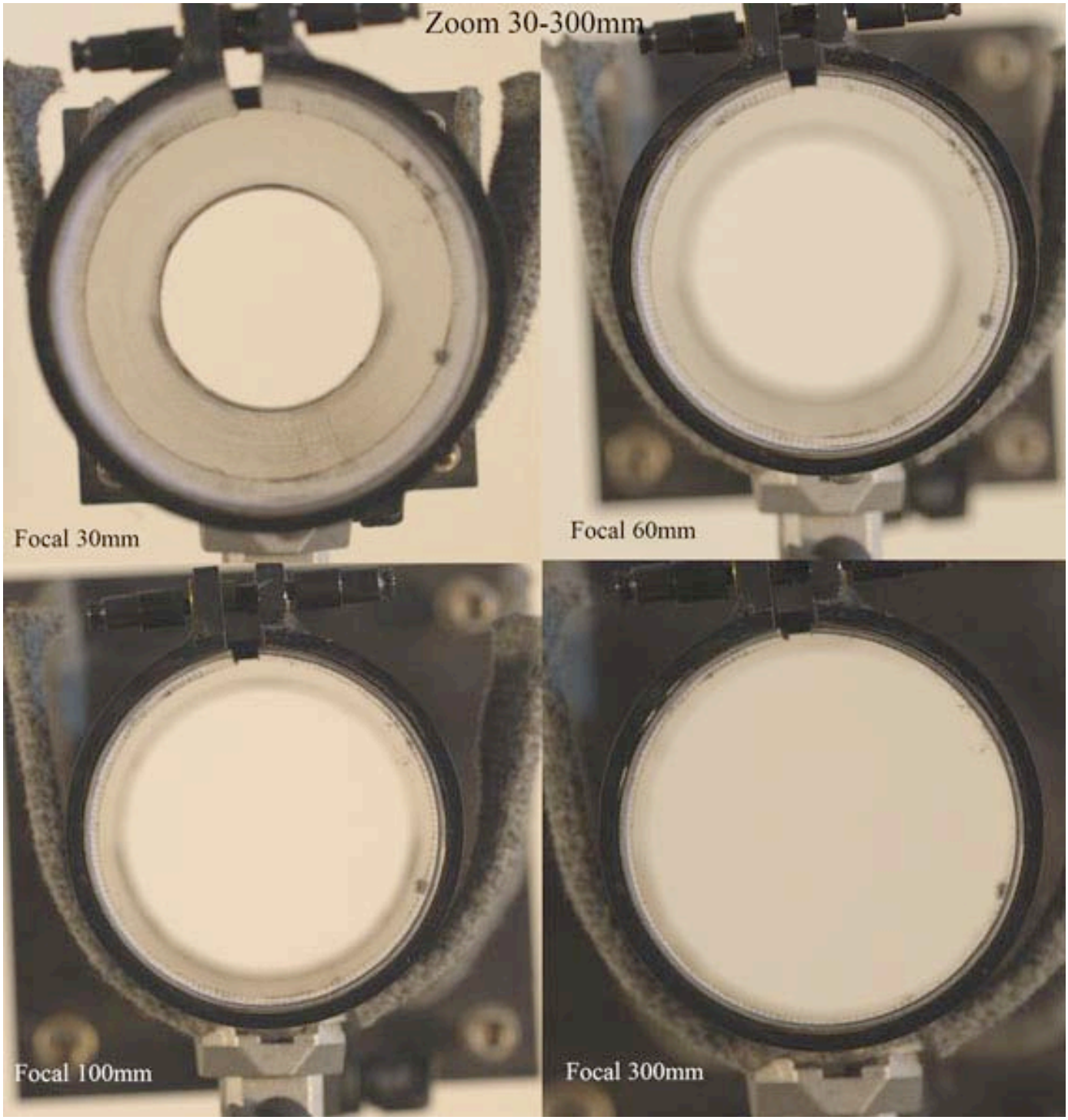


Focal length 100mm

Focal length (mm)	Barrel distortion (SMIA TV %)	Pincushion distortion (SMIA TV %)
30	- 3.65	
35	- 1.22	
60		2.08
100		2.26
200		2.02
300		2.01

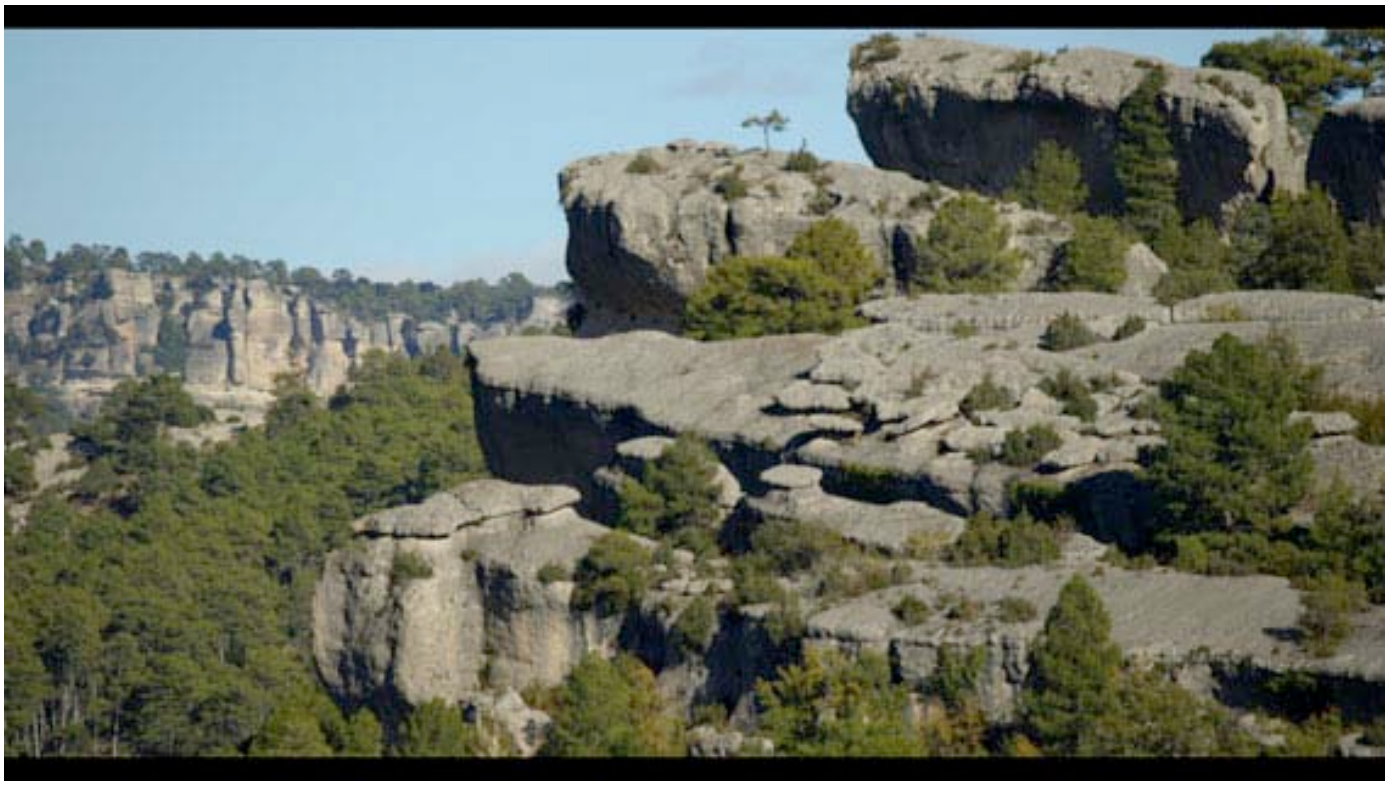
Predictably, the barrel distortion is more significant if we use larger wide-angled lenses, and the pincushion distortion is larger with longer lenses, it is significant with the 100m. However, the Zoom generally shows lower aberration than the 14.5-60mm, moreover we can't clearly see it on frames from outdoor locations.

Perspective Distortion



Above, we show the perspective distortion in comparison between the two most extreme lenses of the Zoom. We have photographed a cardboard cylinder in such a way that its optical axis matches up with the axis of the cylinder. If we compare the distance between entrance and exit circumferences of the cylinder, we can see that distortion is quite different from the largest wide-angle, the 30mm, and the most telephoto, the 300mm. It gives us ideas about how the relation is among foreground, middle ground or background of the image at different focal lengths. To me, as a Director of Photography, it is important to keep the spatial cohesion; the relative distances among foreground, middle ground and background of the image are essential to keep such cohesion. In this case; we believe that the difference between both of extreme focal lengths is really large. So, if we compare images from 30mm until 50mm lenses with images with the 300mm lens, we can observe that foreground, middle ground and background really look “compressed” with the last lens. Next, frames from the extreme focal range; we can see the “compression” of the foreground of the stone against the background of the canyon with the 300mm lens; however we can see the distance among different mountains until reaching the visible horizon with the 30mm.

Ventano del Diablo. Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 30mm T 4.7. ND from camera 6 Stops. Graded

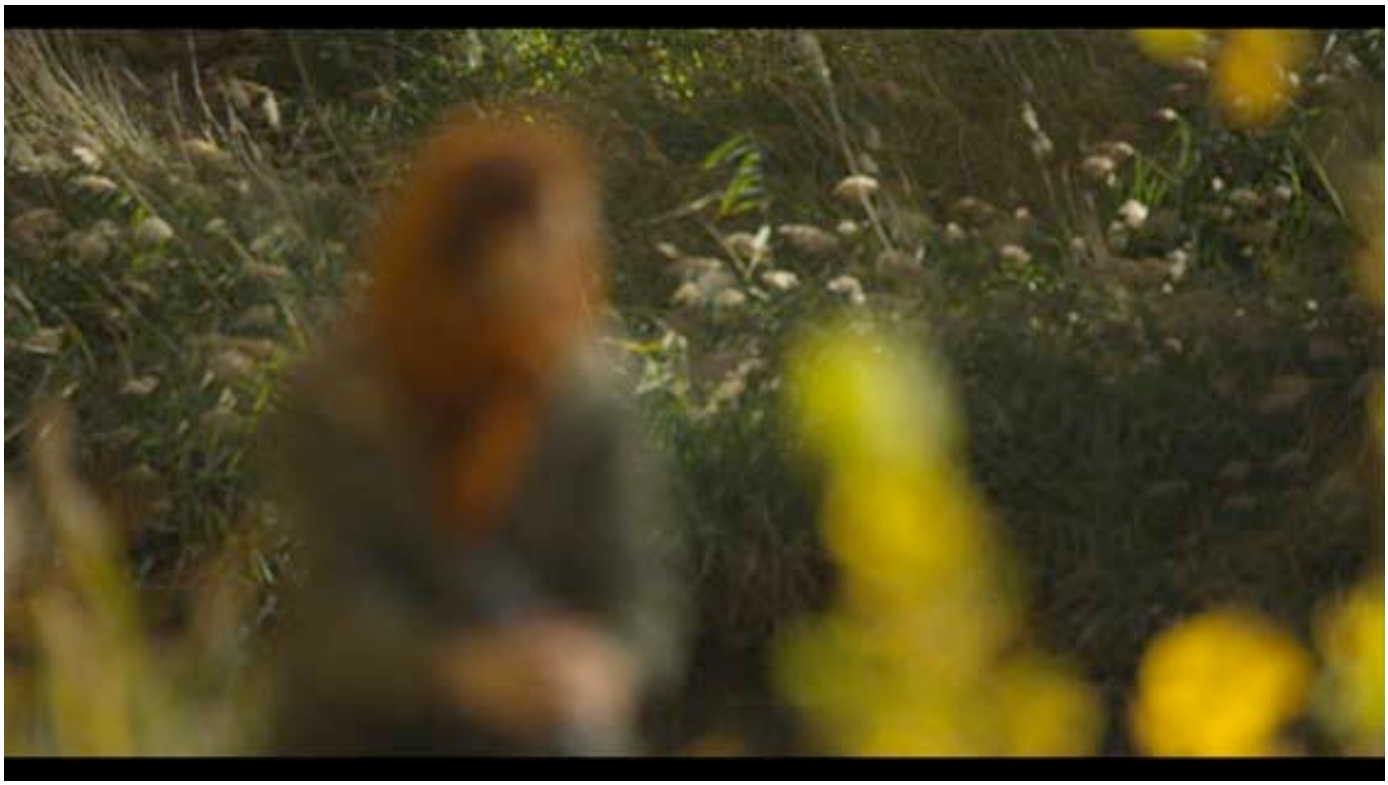


Ventano del Diablo. Cuenca. (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º . Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 300mm T 4.7. ND from camera 6 Stops. Graded. Zoom in over the previous image

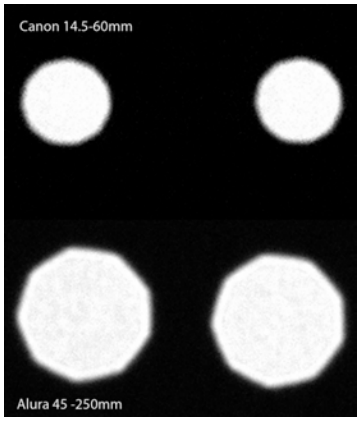
We can see how foreground, middle ground or background look "compressed" with the 300mm lens on the two next frames; in addition we can see how the out of focus is. This is one of the most outstanding features of the Zoom. Out of focus is really "beautiful"; we could affirm that they have an excellent *bokeh;* owing to the 11-blade aperture diaphragms, this feature is shared with the 14.5-60mm.

With no doubt we like a lot the out of focus condition because it builds really an elegant image, it gives certain softness on the backgrounds, but at the same time it does not lose the feeling of sharpness, as we have already pointed out in the resolution section.

Hoz del Júcar. Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º . Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 300mm T 2.95. ND de camera 4 Stops + Polarizing. Graded. Focus on the model



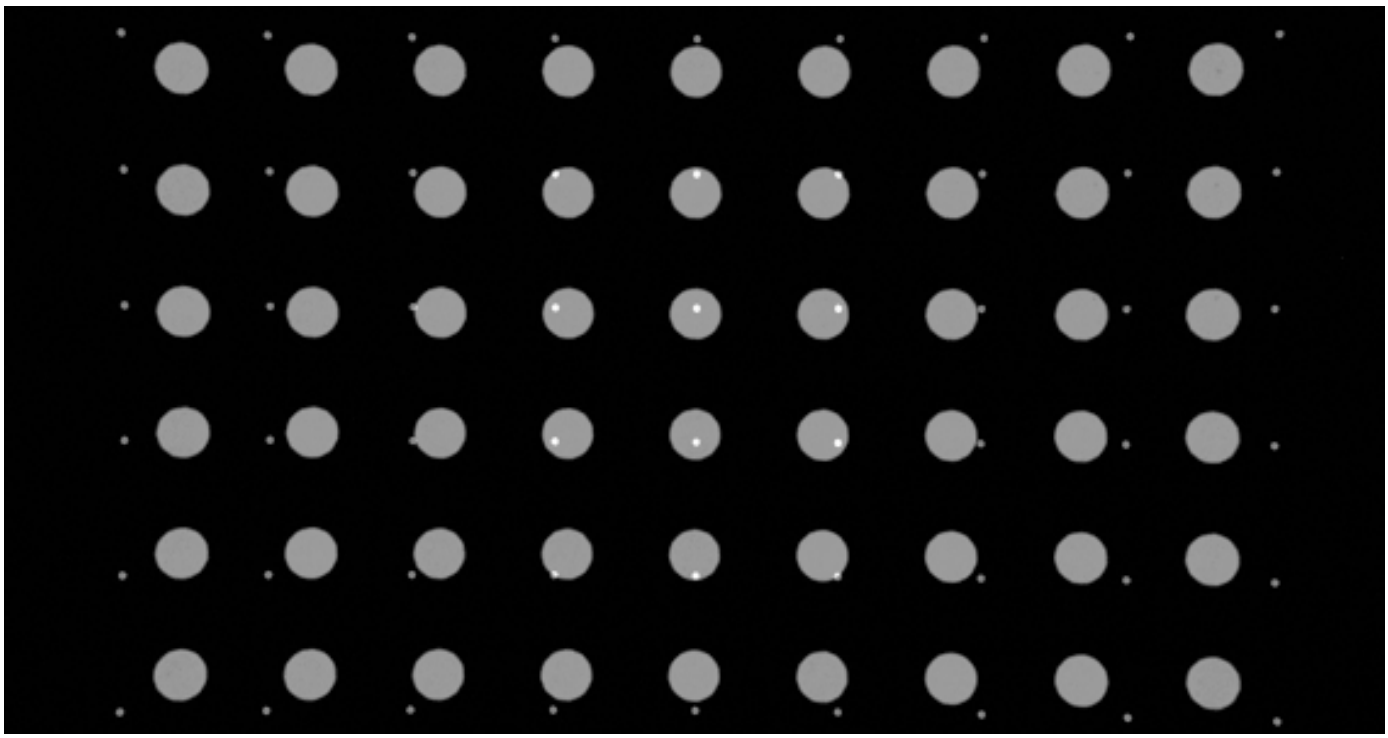
Hoz del Júcar. Cuenca (Spain). . Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 300mm T 2.95. ND from camera 4 Stops + Polarizing. Graded. Focus on background



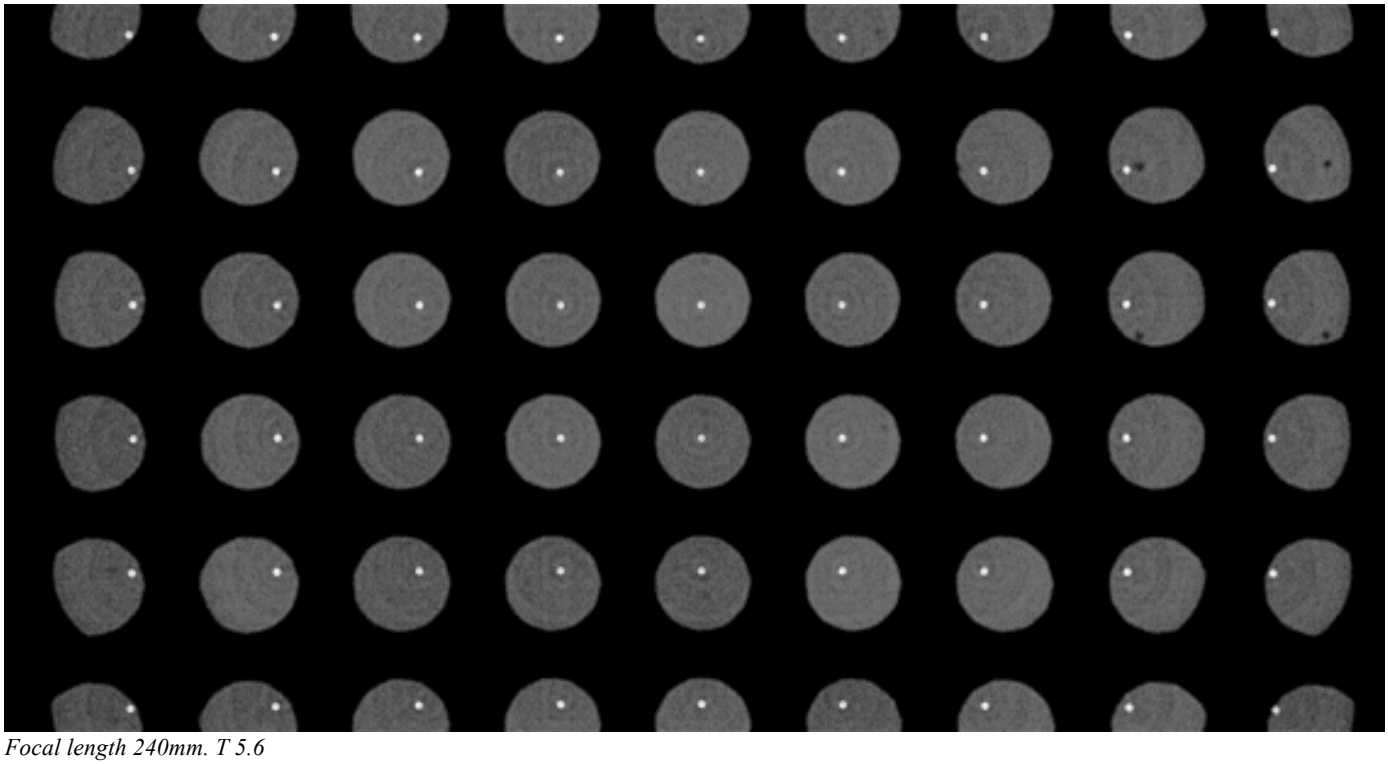
As a comparison, we show a cutting of our Via Stellae chart on the left. We can see the punch-holes with the Canon Zoom which we are examining right now (top), and with an Alura one (bottom). We can see on the bottom how punch-holes are polygonal-like; it means that out of focus is less soft, more abrupt than those provided by the Canon lens.

Once again, we have used our Via Stellae chart to look for other kind of aberration. We have not seen anything significant regarding coma, astigmatism or field curvature effects. However, we have still done another test; we have shot the chart both focused and out of focus; then we have superimposed one image over the other one to see how the lens "breathes".

Next, we show the effect with two different lenses of the Zoom.



Focal length 100mm

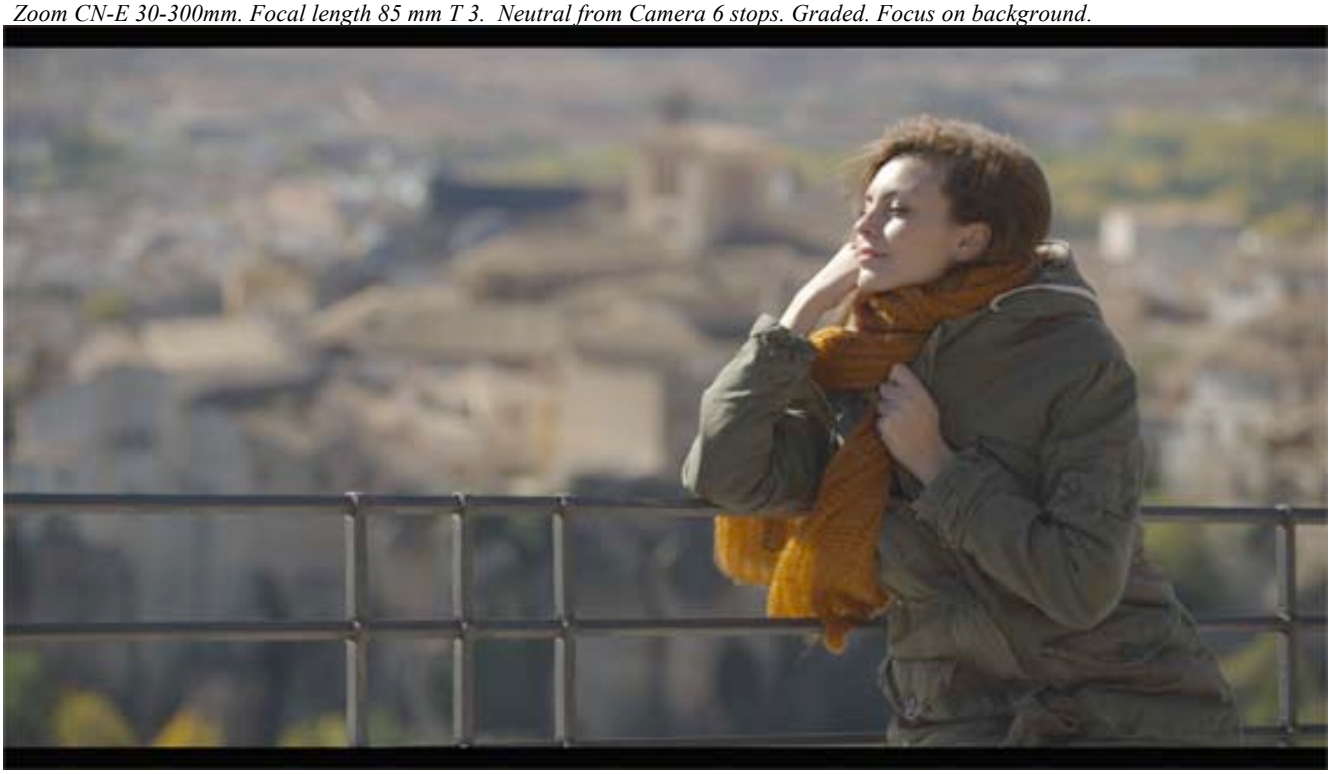


Focal length 240mm. T 5.6

With the longest lens, 240mm, both focused and out of focus points fit, although out of focus points are slightly moved outwards regarding the central point. We have also seen vignetting effect on sides, but we are going to talk about it in the light uniformity below. On the contrary, with the 100mm lens, out of focus points move towards the sides, leaving quickly the axis of the focused point. Movement variations of the out of focus elements are more significant with the more telephoto of the Zoom than the shorter ones. With a 30mm lens, there is hardly any movement, and keeps the background size; we feel that the out of focus element stretches both outwards and inwards; giving a feeling of making convex: center pulls sides, and sides pull center too. On the contrary, it does not occur with the longer lenses; the out of focus of the background "increases", it expands forwards, increasing its size.

Let us see next example.

Viewpoint. Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 85 mm T 3. Neutral from Camera 6 stops. Graded. Focus on background.



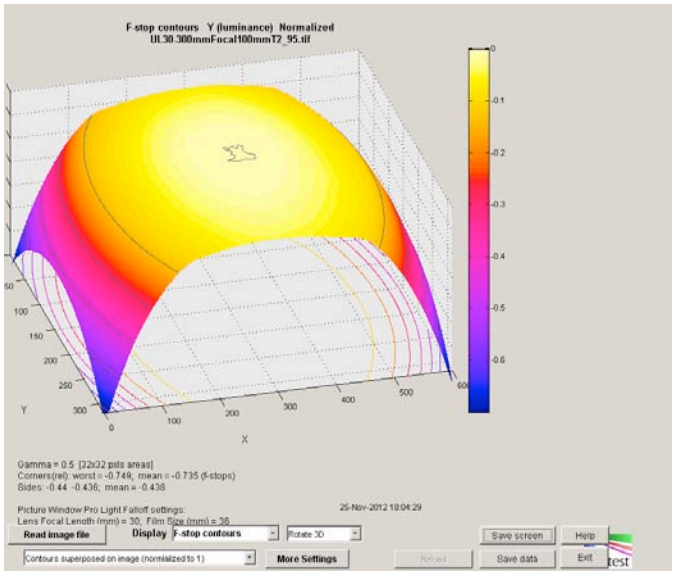
Viewpoint. Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 85 mm T 3. Neutral from camera 6 stops . Without grading. Focus on model.

Above, we show an enlargement of the side of the frame. Changing focus means that the background increases; pine placed on the side of the frame practically disappears.

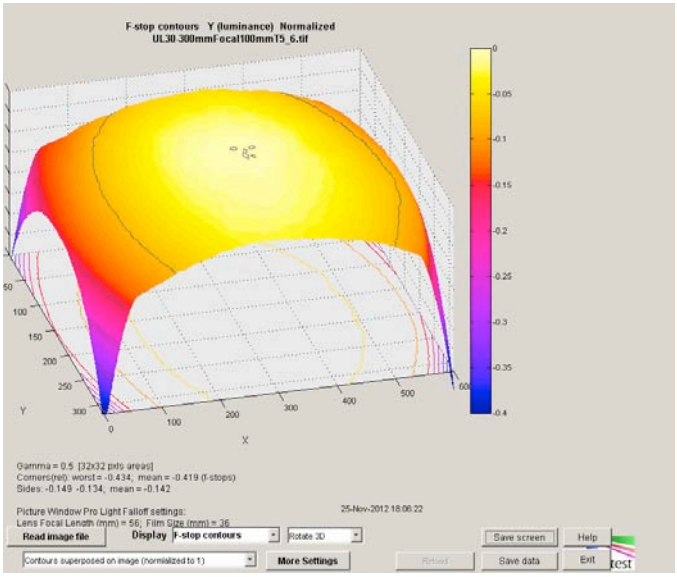
Light uniformity

For this section test purpose we have used the LV5 light sphere; it grants a homogeneous illuminated surface.

We have analyzed every lens through Imatest at different T stops. On the right graph, we can see the standardized value of brightness at 1 (yellow tone) in the center, and how it is smaller as we move closer to the corners and the sides (violet and blue). The program gives brightness differences in f-stops values. As an example, we show graphs with the 100mm lens at two different T-values, more open, 2.95, and more normal, 5.6.



T 2.95



T 5.6

We can see how light uniformity is better at T5.6; loss of light on sides and corners is lower compared with the open T. Next, a summary of the two lenses at different T-values.

Focal lengths (mm)	T-value	Average on corners (f stops)	Average on sides (f stosps)
30	2.95	-0.746	-0.416
30	4	-0.511	-0.221
30	5.6	-0.439	-0.161
100	2.95	-0.735	-0.438
100	4	-0.492	-0.238
100	5.6	-0.419	-0.142
300	2.95	-0.554	-0.417
300	4	-0.565	-0.461
300	5.6	-0.433	-0.309

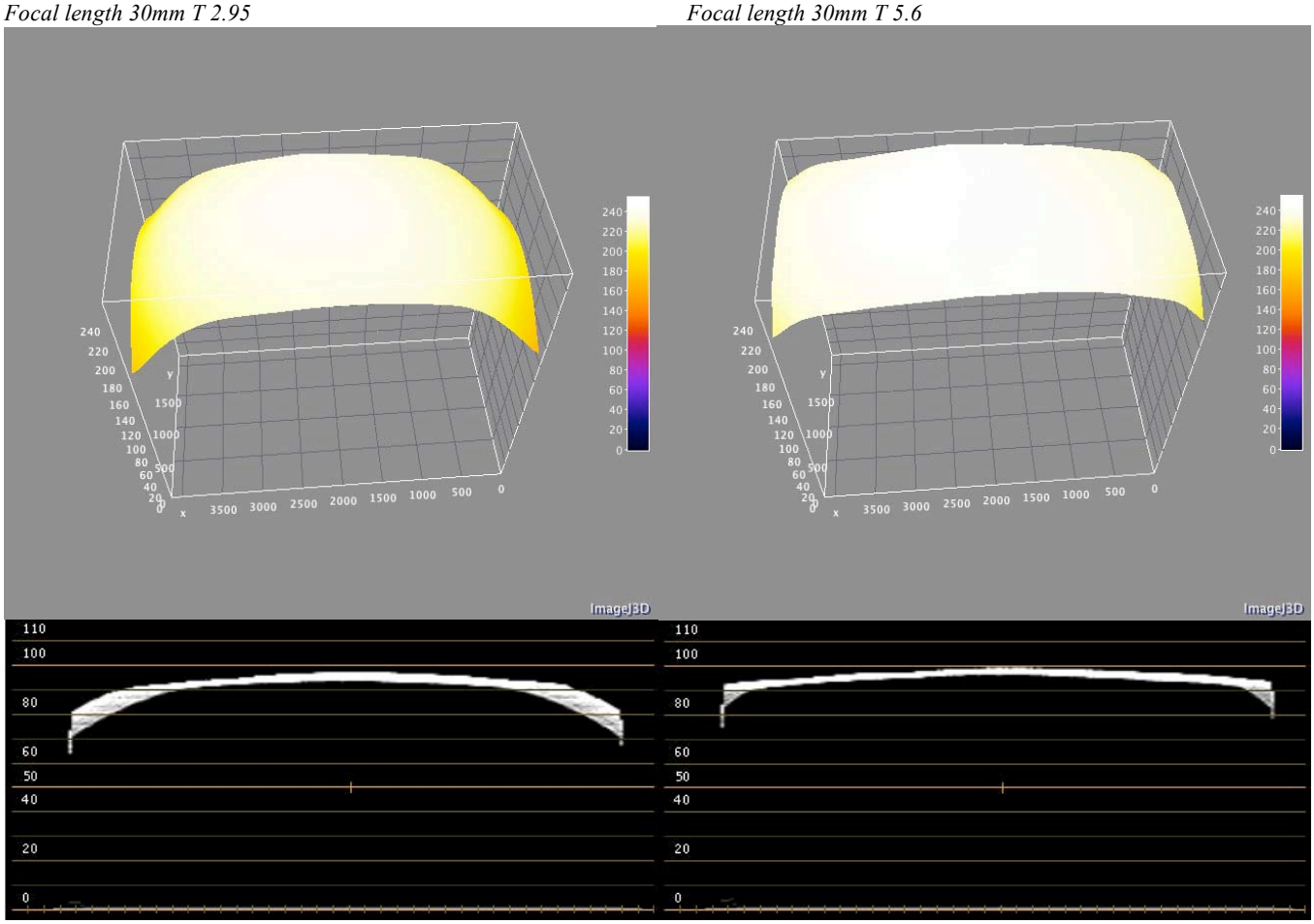
Higher values are marked in red. They are related to the 30mm lens at the most open T on corners and to the 300mm on sides.

The table shows that variation is around 2/3stops on corners at most open T. With the rest of the lenses, at different T-values, loss of brightness is around ½ stop. On sides, the 300mm lens shows the largest loss, around ½ stop.

On the next frames we can see difference between the two T-values with the 300mm lens. On the left, it is at T2.95, and on the right at T5.6. Below, there are the graphs which show more clearly how brightness decreases on sides, together with their representations on a wave monitor. The loss of brightness causes a clear vignetting effect as does the Zoom 14.5-60mm.

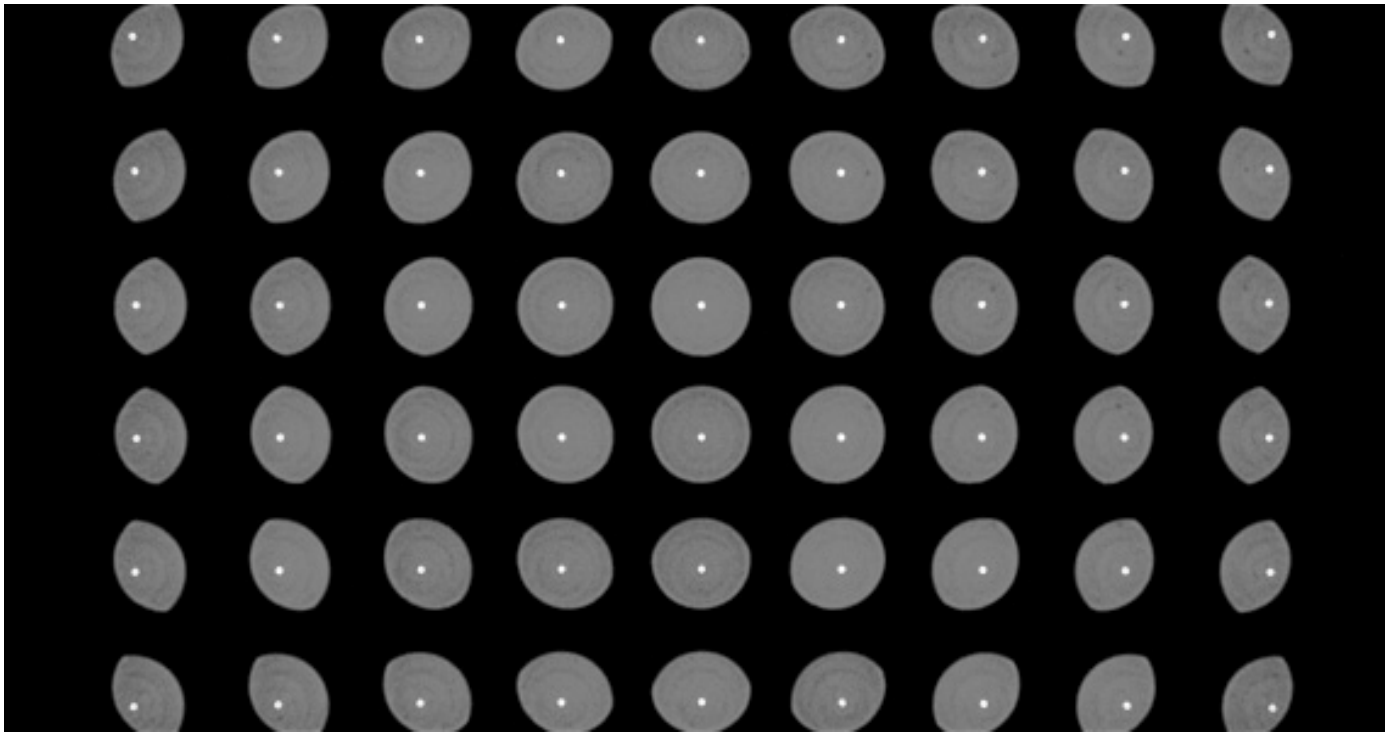
We believe that these values are high. They can be observed, especially on the corners, as we are going to see it on frames from outdoor locations.

Focal length 30mm T 2.95 *Focal length 30mm T 5.6*



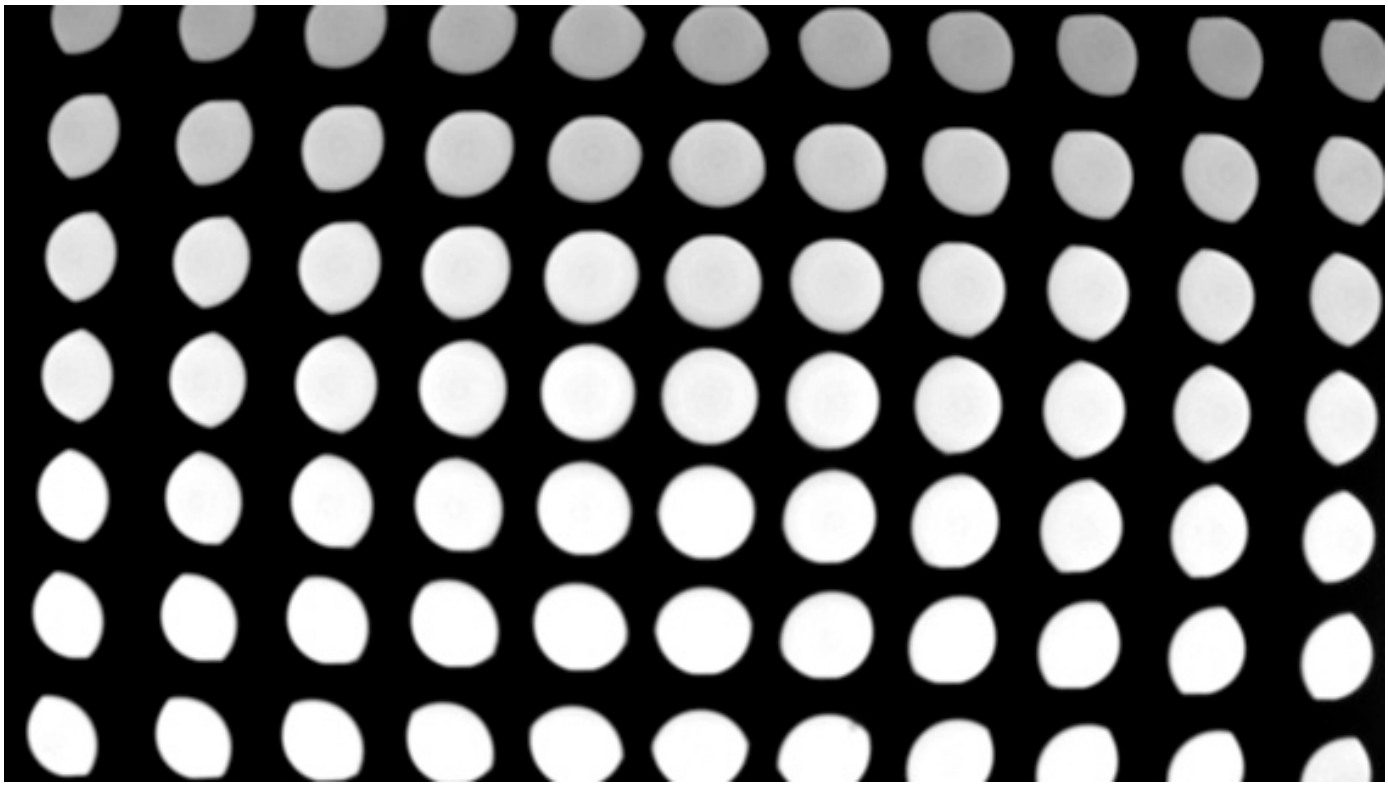
This loss of brightness is observed with every lens at open T-values. It is caused by both the vignetting effect and the fourth power of cosine law. Vignetting means that when we open the diaphragm in the center of the image; that is, on the optical axis, the projection of the point is a circle, whereas if we move away from the axis, then the projection of the point is an oval because the rings of the lens eclipse part of the light. As we close the diaphragm, oval becomes circle, improving light distribution. Upgrading vignetting can be achieved by increasing the diameter of the lens; the longer is the diameter, the lower is the vignetting effect.

Next, how looks our Via Stellae chart.



Focal length 240mm. T 2.95. Superimposition of the focused and out of focus point.

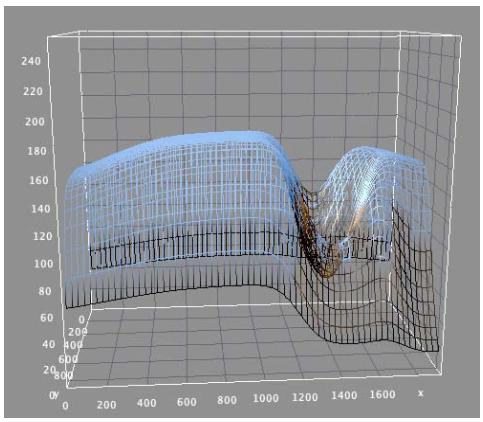
We accept normally certain quantity of vignetting, and it generally appears with the zoom lenses; for example, with the zoom Alura 45-250 T2.6, to which we can clearly see the effect with the 250mm lens

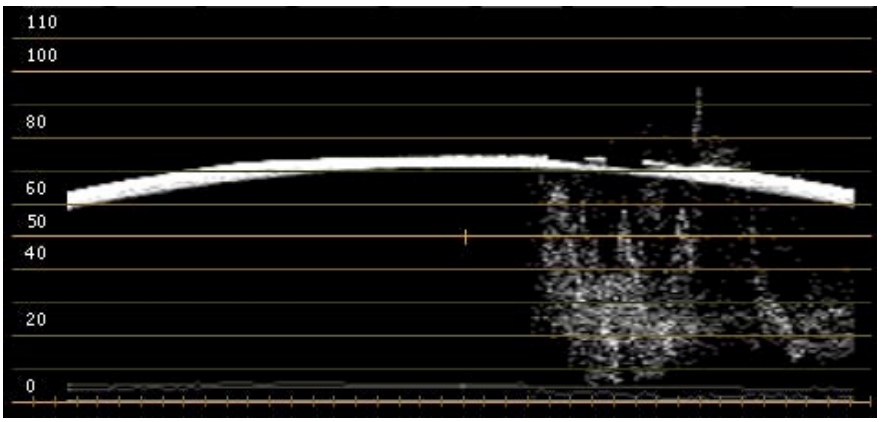


Zoom Alura 45-250mm. Focal length 250mm T 2.6

Next, we show a frame with the 300mm lens at an intermediate diaphragm. We can see loss of light on the sides. I have added a graph of brightness values to see clearly such a loss; we can clearly see how sky loses light on both right and left of the frame. If we remember the table of values at the beginning of the section, luminance losses on sides and corners with the 300mm at this diaphragm was a bit lower than ½ stop.

Cathedral of Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Focal length 300 mm T 5. Neutral from Camera 6 stops+ external N3. Graded





All together, we believe that the light uniformity at open T-values makes excessive vignetting and loss of brightness; although it is more or less visible on the frames depending on the lighting and contrast of the scene. Vignetting changes slightly at different focal lengths; although it generally remains similar, it is bit higher at the largest wide-angle of the Zoom (30mm).

Flare and Veiling Glare

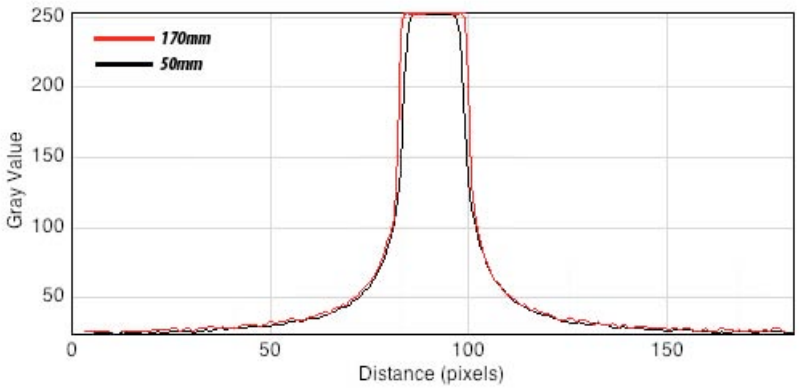
With the use of absolute black from the grey- scale (Black Hole) we have processed the image through Imatest to get the level of veiling glare. We have received the following values at T3.7 at the different focal lengths.

Focal-length 35mm 0.309%
Focal-length 100mm 0.323%
Focal-length 300mm 0.251%

As the Zoom 14.5-60mm, results are extraordinarily low, and it consequently gives an excellent contrast, with clean black and well definite white, although on the other hand these results are astonishingly smooth. The glare is lower than those from other lenses already studied, lenses, which are Prime, such as the Leica Summilux or Cooke Panchro. Let us see these frames of our dolls with candles.

Canon C500+Codex - 4K (4096x2160)– Raw 10 bit- Iso 850 - 25 fps – 180º. Gamma y Matrix Canon Log.
Zoom CN-E 30-300mm. (50mm) T2.95. 3800kº

Canon C500+Codex - 4K (4096x2160)– Raw 10 bit- Iso 850 - 25 fps – 180º. Gamma y Matrix Canon Log.
Zoom CN-E 30-300mm. (170mm) T2.95. 3800kº



We have cut a part of the first candle on the left to both lenses; then we have superimposed the two profiles, which show the brightness. We can see that flare is practically identical with the two lenses. We have equally checked that the same happens with every lenses. It proves that the Zoom keeps the good contrast throughout the range.

Sun is in frame on the next images. We can see the sharpness of the reflection over the lenses on the darkened frame. After grading, we can see the excellent behavior of the Zoom, which shows sharpness even in such a difficult condition like this case.

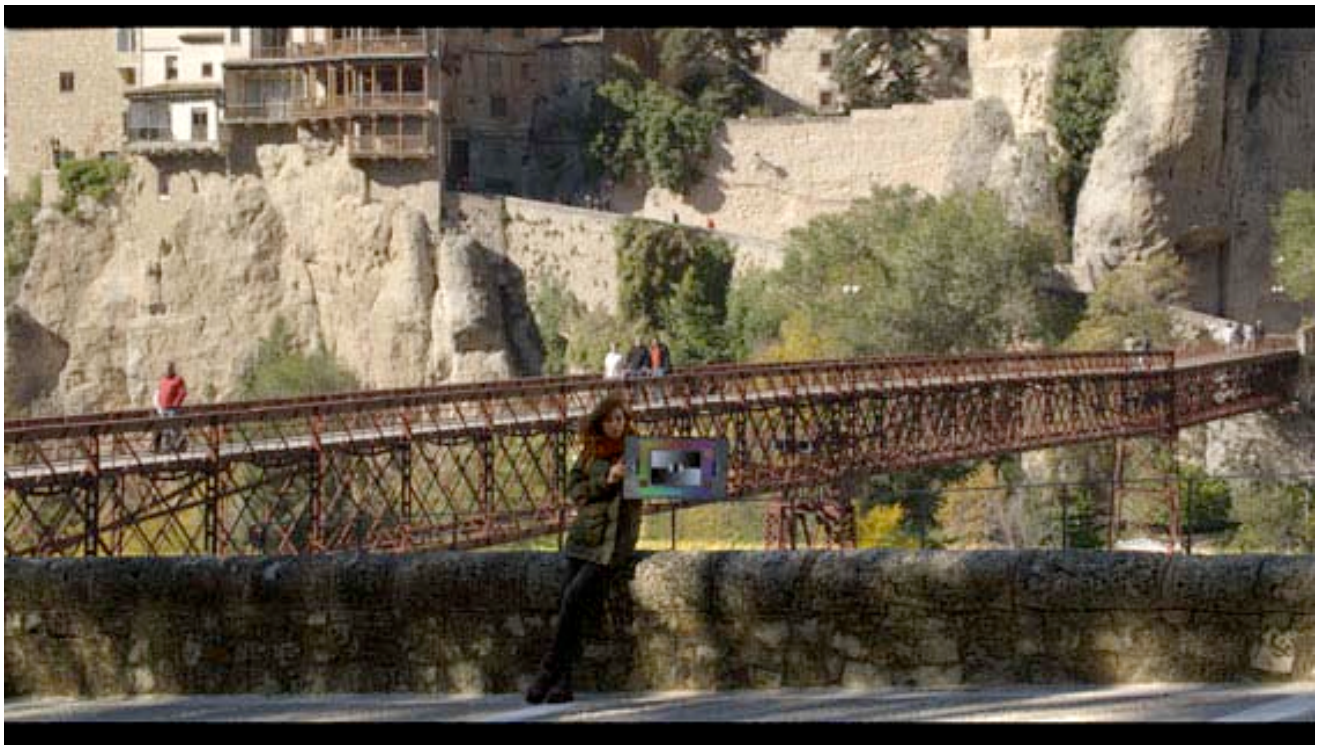
Cathedral of Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Lens 30 mm T 22. ND from camera 6 Stops. Without grading

Cathedral of Cuenca (Spain). Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon. Zoom CN-E 30-300mm. Lens 30 mm T 2.95. ND from camera 6 Stops. Without grading

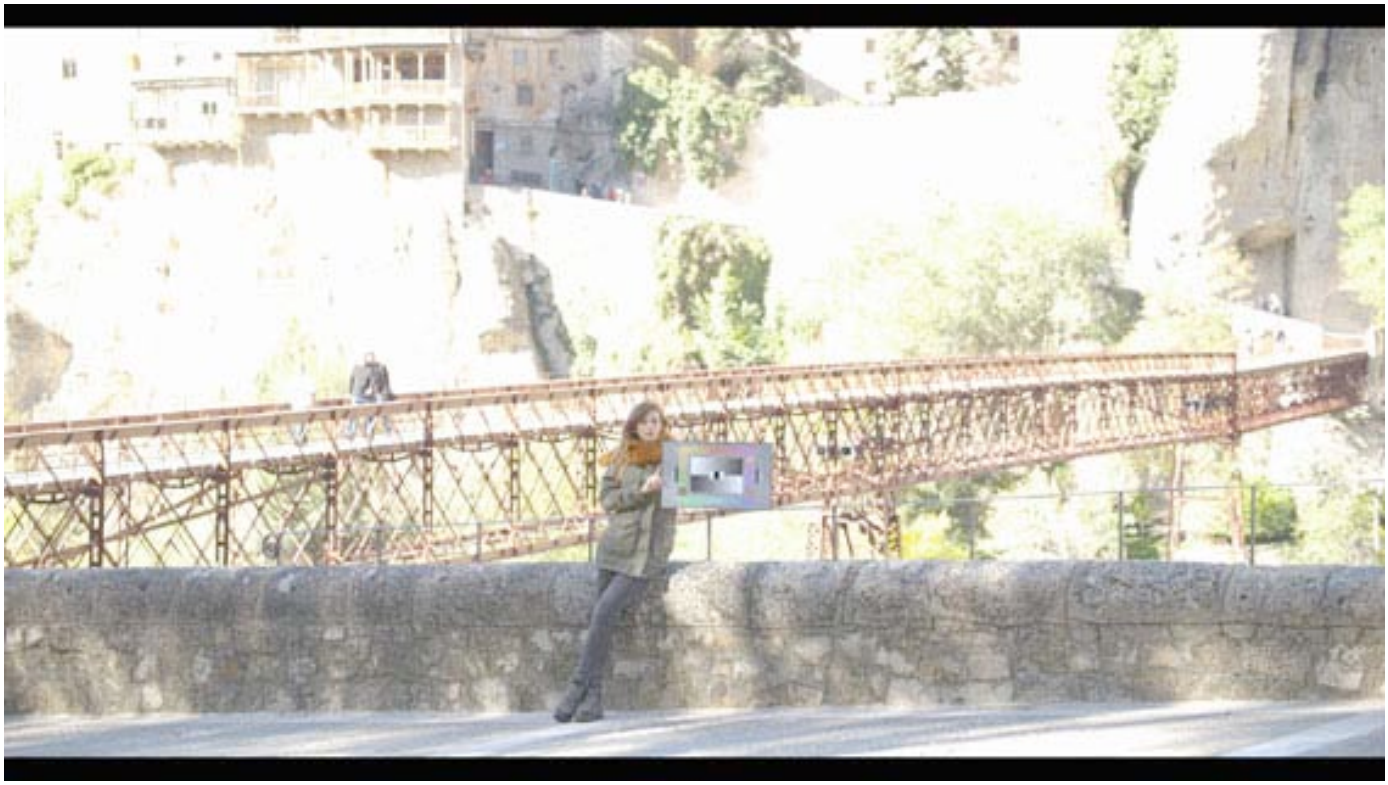
Next, frame from the fiction short-film Ucronías. We can firstly see how the lens handles the external bright regarding Ana, secondly how it keeps the detail and sharpness. In addition, we can check again the "beautiful" out of focus of the background.

Ucronías. Canon C500+Codex - 4K (4096x2160)– Raw 10 bit- Iso 850 - 24 fps – 172,8º . Gamma y Matrix Canon Log. Zoom. CN-E 30-300mm. (95mm) T2.95. Filter Classic Soft. 5600kº.Filter neutral in camera 2 Stops. Without grading

Let us see now these frames from outdoor locations. Background of the first frame is properly exposed, whereas the second one is overexposed. It is in the second frame that we can observe the excellent behavior regarding both flare and veiling glare of the Zoom; despite white is highly overexposed, it is definite, clean and does not contaminate the rest of the image.



Cuenca (Spain) from El Parador. Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Lens 50 mm T 11. ND from camera 2 Stops. Without grading



Cuenca (Spain) from El Parador. Canon C500+Codex - 4KRaw (4096x2160)– 10 bit- ISO 850 - 25 fps – 180º. Gamma y Matrix Canon Log. Zoom CN-E 30-300mm. Lens 50 mm T 2.95. ND from camera 2 Stops. Without grading

Other considerations by our First Camera Assistants

We have analyzed two Zooms which are clearly designed taking into account how is developed the work in cinematographic environments; it means, speaking about Canon, a change of huge importance regarding its goals achieved in television, as well as its goals regarding lenses used in still photography. Since Zooms has been designed for cinematographic environments, it implies that lenses are larger because we have to take into account that we manage a long range of focal lengths. The 30-300mm gives a long range, so its dimensions and weight are considerable (35cm long, and weighs almost 6kg), and its minimum focusing distance (1.5m) adjusts with the more telephoto lenses, but it is excessive with the wide-angles. The 14.5-60mm is less heavy (4.5Kg), and so it is easier to handle, however dimensions are similar to the 30-300mm. Owing to the dimensions and weight of the Zooms, they a placed out of the ratio dimension/weight suitable for working, for example, with a hand-held camera or Steadycam. In any case, both objectives are less voluminous than the well-known Angenieux Optimo 24-290mm and more similar to earlier made by the same manufacturer. On the contrary regarding the Optimo zoom, the Canon Zooms can be easily assembled by just one person, although the First Camera Assistant's typical skills are necessary to change lenses of large dimension. As usual with such a dimensions and weights, a fine leveling of the head is required, as well as an adequate adaptation of the spring.

Both front diameters of the lenses are the same, 136mm. So, we need a 6x6 lens hood, or at least 4x5.6, as the Arri MB-29, to which we can adapt a 138mm ring filter.

Both focus rings of the Zooms are placed in different positions. So, we have to move the follow focus and the focus motor when we have to change the lens; on the other hand it is normal in lenses with such a different range.

Of course, both objectives have the suitable pinions to work with the follow focus and professional motors. There is enough space in between them to assemble easily a maximum of three motors of any remote system.

Both Zooms have fluorescent marks to the focus to use under dark condition, but only on the right side, which is the less used by the Assistants. Moreover, according to other Assistants who were working in this test, there are too many marks of distance in some parts of the ring, and are not duly numbered, so it is a bit difficult to discern the focus distance when they do a quick look on the scale; especially with the 30-300mm.

The diaphragm ring, as well as the zoom and focus, have optimal and nice fluidity; they are neither excessively hard nor too weak, as it happens with some fixed lenses of other manufacturers.

To carry the two objectives we will need one middle/large suitcase for each one.

Finally, I would like to add that using these Zooms with small cameras as the C300 or C500 implies an unpleasant configuration to develop the task of the First Camera Assistant, because the lens are larger than the cameras, and these cameras do not have their own output suitable for a wireless follow focus.

Conclusion

The Zoom 30-300mm, as the 14.5-60mm, shows an excellent resolution and sharpness, with a high contrast, clean black and definite white; although we have been pleasantly surprised by a general feeling of smoothness from the image. The contrast is due to, among other factors, the low level of veiling glare that lens shows, as well as an astonishing handling of the flare. The Zoom shows "transparent" regarding color; we can't observe any deviation of tone, neither to the warm nor to the cold one; it is able to transfer the whole color scale of the scene with very natural appearance. It should to be pointed out that lateral chromatic aberrations have practically disappeared; they can hardly be seen on shot images. As we have been saying, the softness of the images that the Zoom projects over the sensor, allows really a remarkable *bokeh*. The out of focus entails changing size of the frame, above all with the longer lenses; despite it is visible, is not significant.

Geometric and perspective distortions are usual to such rank of zooms; however we believe that the 300mm lens compresses foreground, middle ground and background excessively; not only the background seems to be closer, but also its apparent size seem larger than the foreground and middle ground. In this regard, the Zoom makes very beautiful images with such a telephoto lenses, as we have already showed; however, in order to keep the spatial cohesion whenever it is needed with other lenses, a careful attention would be needed. Vignetting from the lens is specially significance, with loss of brightness on sides; we could confirm the effect on frames from outdoor locations; undoubtedly, it is the least significant of the Zoom. Nevertheless; vignetting keeps, more or less, disguised on the most of the frames; for this reason, the excellent look of the image projected by the lens is not distorted.

It should be pointed out that the every feature studied throughout the test fits with every lens and at the same T-values; as a result, the Zoom shows a quite high consistence and solidity.

As a Director of Photography, I would like to stress especially the so natural appearance, smooth, and at the same time clear that the Zoom provides. It creates images of great plastic gorgeousness without giving up outstanding technical performance.

Video

Test https://vimeo.com/64070364
https://vimeo.com/64555403
Short film https://vimeo.com/63712428

Credits
Cinematography and test director: Alfonso Parra AEC
Producer manager: Carlo Rho
Our Model: Laura Rodriguez Panizo
Camera assistant and focus Puller: David Panizo and Saúl Oliveira
DIT: David Coello and Daniel Pérez
Production assistant: Sergio González

Thanks to: Carlos Castán, Larry Thorpe , Juanma Gómez, Sergio Gómez, Miguel Ángel Capitán, Roberto Gómez, Adriana Bernal, Julio Paniagua, Adriana Angel, Ignacio Gabasa, Ana Risueño, Alsa Villagran, Concha Martí, Eva Martos, Ramiro Sabell and Javier Serrano.