

How to test the Autofocus of your lenses

Written by Gerry Gerling

Have you ever noticed when you are taking a picture of an object where the focus is critical, something else in the picture is sharper than the place where you focused?

For example you may be critically focusing on the subject's eye and either the nose or the ear in the resulting picture is sharper than the eye.

There is an explanation for this, a test and three solutions.

The Explanation -

Every dimension of everything that is manufactured has a dimension tolerance.

Dimensional tolerances are something like depth of field. It is a range where the dimension is acceptably accurate.

For instance, the dimension of a feature of a manufactured part may be 1 in. If it is not a critical part the tolerance might be plus or minus 1/16 in. and would be written $1 \pm .062$ in.

However if it was a critical dimension it may be $1 \pm .001$ in. or in some extreme cases $1 \pm .0002$ in.

The point is that parts cannot be made 100% accurate 100% of the time. There is always a tolerance where the dimension is acceptably accurate and the finer the tolerance the more costly it is to manufacture the item.

In making a lens, or any manufactured item, all of the parts have tolerances and they can be additive or subtractive or if you are lucky, the pluses will cancel the minuses.

So it is possible for some lenses to have most of the tolerances stacked in one direction which will make the autofocus point slightly closer or further away than the ideal.

The lens manufacturers do take into account these slight inaccuracies knowing that most of the assemblies will fall within what they deem to be acceptable.

More expensive lenses go through another quality step where the autofocus is manually corrected so the object is tack sharp on the spot where the lens is focused.

The Test -

You can test the accuracy of the autofocus of each of your lenses so that you will know how exact the autofocus is.

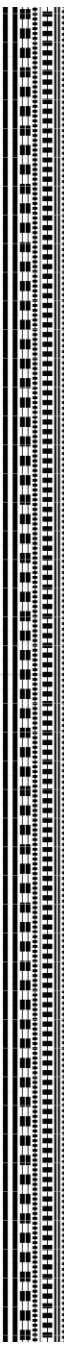
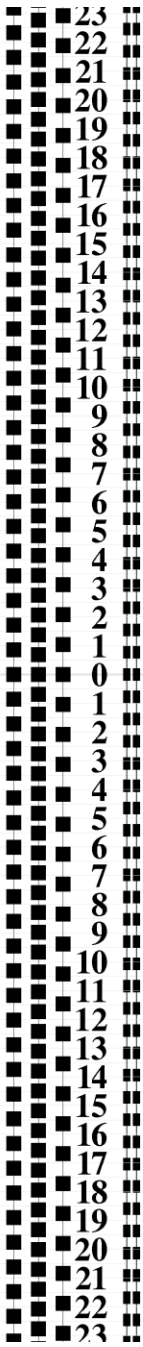
Go to the following website, read the procedure and print off some test sheets.

<http://regex.info/blog/photo-tech/focus-chart>

This is a fairly simple procedure. It is best to use camera settings which will give shallow depth of field.

(You will recall that to obtain the shallowest DOF you use the largest aperture, the longest focal length and the closest distance.)

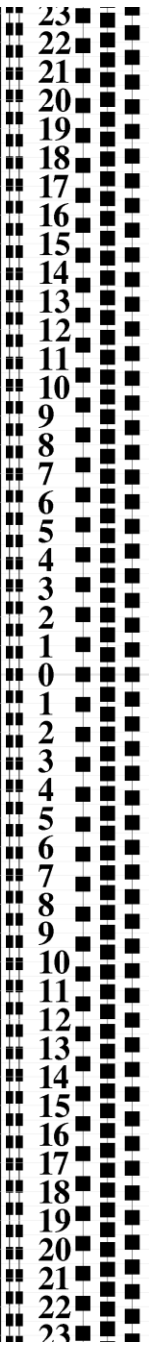
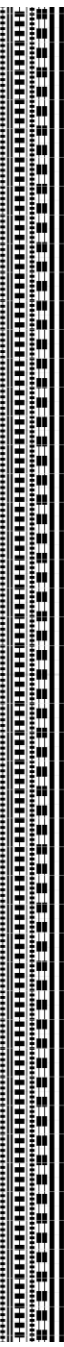
The following page shows a typical test sheet.



Jeffrey's Focus Test Chart, Version 1.0



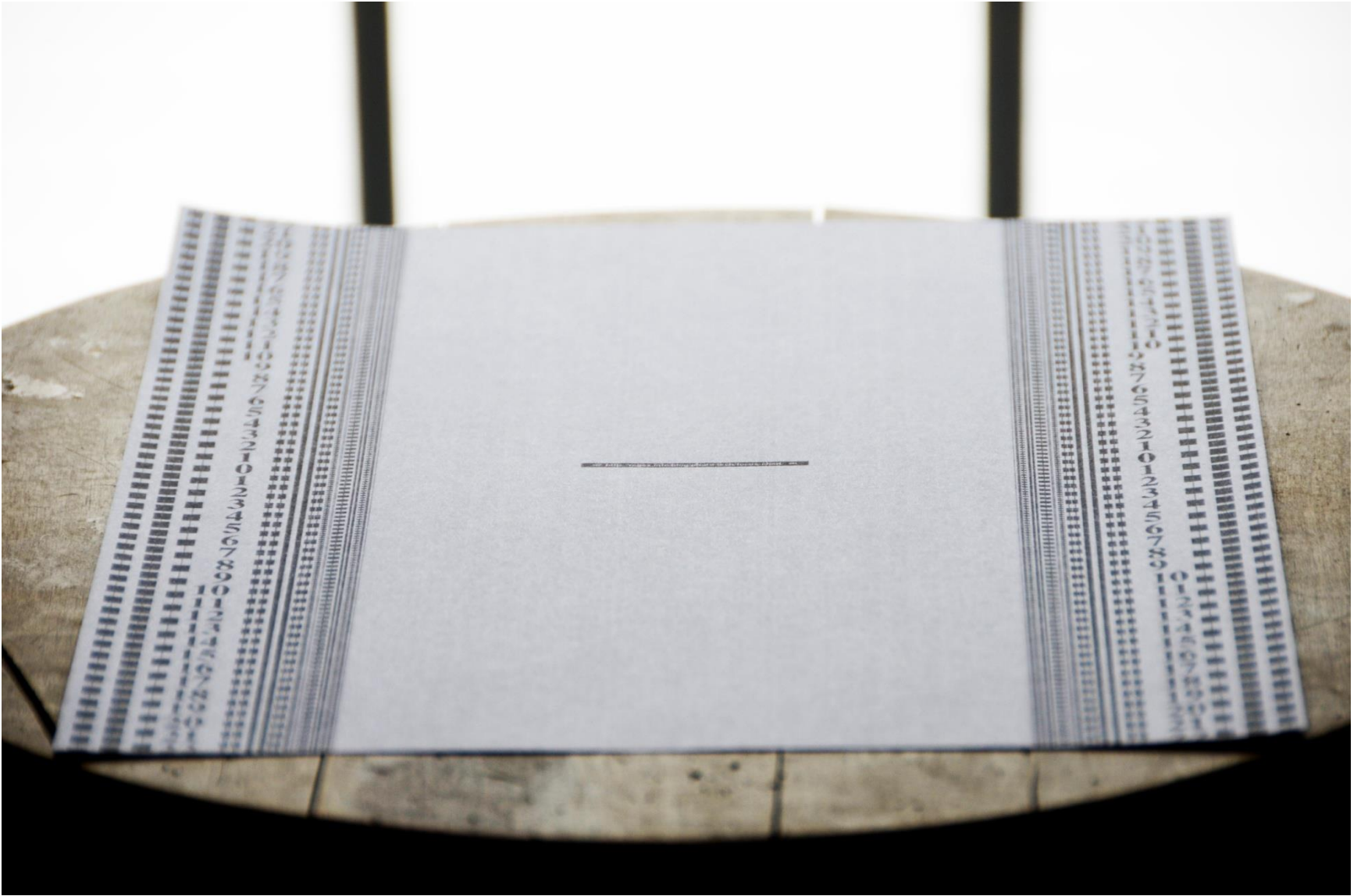
<http://regex.info/blog/photo-tech-focus-chart/>



Test Procedure -

- Place the test sheet on a flat illuminated surface;
- Put your camera on a tripod and position it high enough so that you have a shallow view of the test sheet;
- The test sheet should be flat (I would suggest using thicker paper if you have it.) and the sheet must be aligned squarely to the camera;
- You must set the focus mode on your camera to spot focus;

- If it is a zoom lens, zoom to the longest focal length that is practical. (Ideally the sides of the test sheet should be at the sides of your frame.) You may have to move your tripod forward or backward to suit;
- If it is a prime lens move the tripod close enough so that the sides of the test sheet are at the sides of your frame;
- Use Aperture priority and set the aperture wide open.
- Adjust your tripod head so that the spot focus is exactly centered on the heavy black line in the centre of the page.
- Use a remote shutter release and make an exposure.

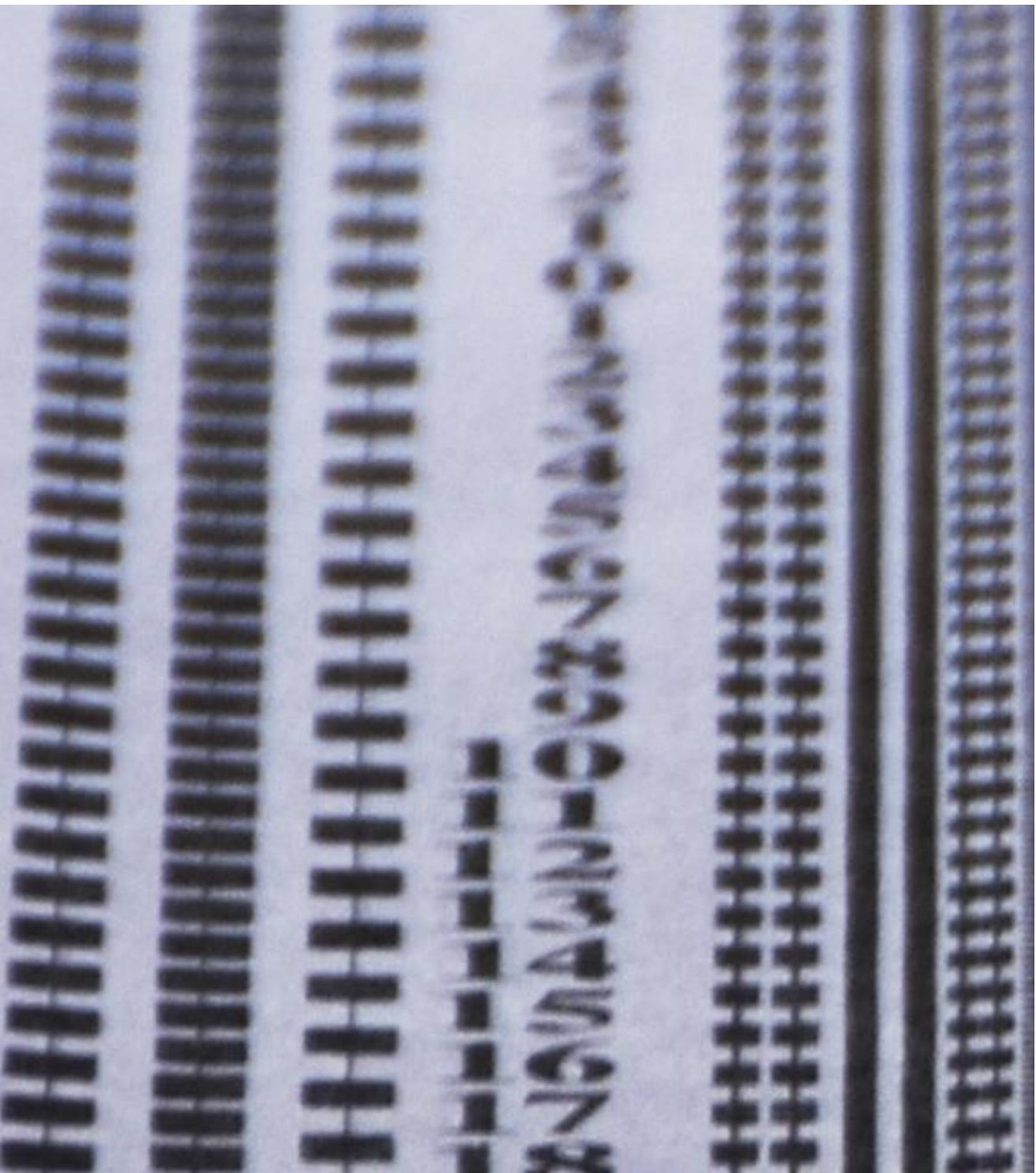


- Remove the memory card from the camera and download the picture to your post processing programme on your computer. Adjust the brightness and contrast for best viewing results.
- Magnify the image on your screen and move the image over so that the list of numbers are in the centre of the screen.

If the autofocus is accurate the zero will be the sharpest number and the sharpness falloff should be equal above and below it.

If the sharpness of the numbers is better beyond zero the lens suffers from back focus.

If the sharpness of the numbers is better in front of the zero the lens suffers from front focus as the following page illustrates.







The Three Solutions -

Solution 1. Live with it. If the autofocus is just slightly off and your camera does not have an autofocus fine tune feature your depth of field will probably take care of it and you can use manual focus for critical pictures.

Solution 2. Fine tune it. If your camera has an autofocus fine tune feature you can make adjustments for front focus or back focus and your camera will automatically make the necessary corrections whenever that lens is installed on the camera. The pins on the lens mount identify the lens. The camera will identify each of your lenses, remember the amount of correction for that lens and automatically apply the correction. How cool is that!

Solution 3. Send it back. If the autofocus is far out and you don't have the ability to fine tune it and you don't want to live with it, you could send it back to the manufacturer for adjustment.

Even if your camera has the ability to fine tune the lens the amount of correction required may be beyond what the camera is capable of providing. Send it back.

If it is still under warranty it will cost you nothing but if it is out of warranty they may charge you for correcting it.

To find out if your camera has the ability to fine tune the autofocus look in the menu.

SETUP MENU



Wireless transmitter	--
Copyright information	ON
Save/load settings	--
GPS	--
Virtual horizon	--
Non-CPU lens data	No. 1
AF fine tune	--
Firmware version	--

AF fine tune

AF fine tune (On/Off)

ON



Saved value

-4

Default

0

List saved values

4/12



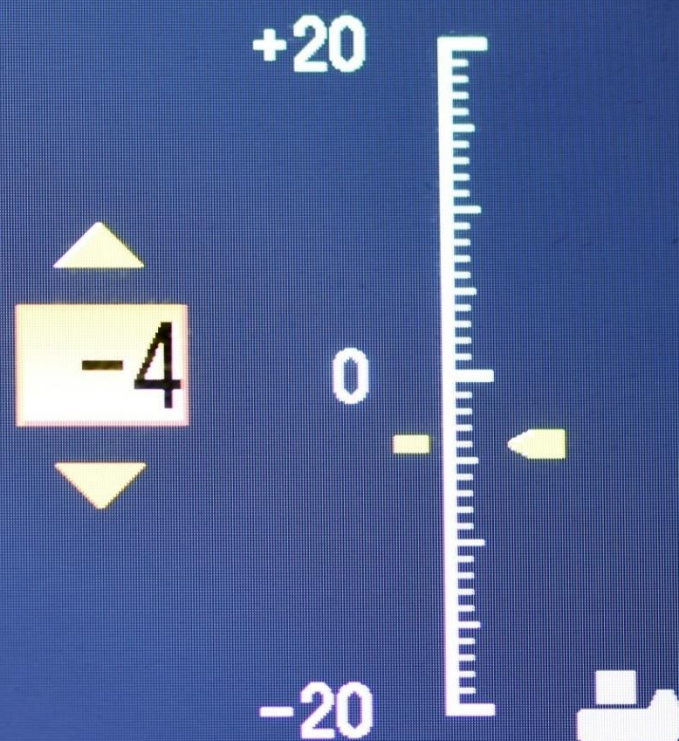
AF fine tune

Saved value

18-200mm

F3.5-5.6 VR

No. --



 Adjust

 OK

Having determined whether you are going to correct for a front focus or back focus problem you will have to guess the amount of correction required.

Using the multi-directional joystick button on your camera simply make an estimate an amount using the up or down arrows.

Click OK then carry out the test again.

You may have gone too far or not far enough but you should be able to zero in on the correct amount of adjustment with just a few tries.

Recommendations -

You should check and make corrections for every lens you have on every camera on which they will be used.

If the camera's autofocus fine tuning can correct the error do not send it back, even under warranty, as the manufacturer will say that it is within tolerance.

How often should you check your lenses for autofocus?

Theoretically, once they are corrected they should not change. However, if the error is due to something that is shifting in the lens e.g. a loose collar, the error may change.

So I would recommend that you retest them after a year or two and if they have not changed they should then remain the same.

Hint: When buying a lens for a camera which does not have the fine tune feature, specify an exchange or return if it is off more than you are willing to accept.

This could also apply to a non-interchangeable camera. Test the autofocus immediately and take it back if it is not to your liking.

We are all looking for sharper images and other than camera or subject movement nothing degrades sharpness more than imperfect focus.

The annoying thing with a lens which suffers from front or back focus is that every picture that you take will be affected.