Simple Lens Testing

- Why bother?
- Issues with lenses
- Lens sharpness
- Barrel and pincushion distortion
- Some SIMPLE tests
- Taking it further

Why bother?

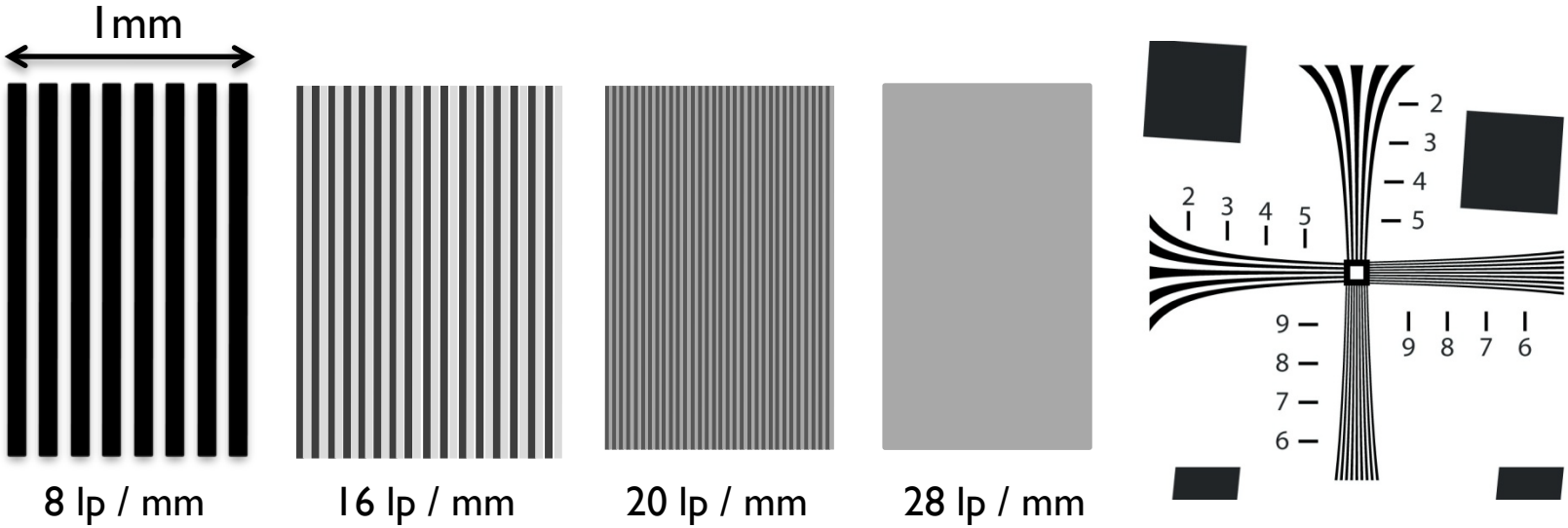
- Knowledge is power
- Know the limits of each of your lenses
- Know how to get the best from each lens

Issues with lenses

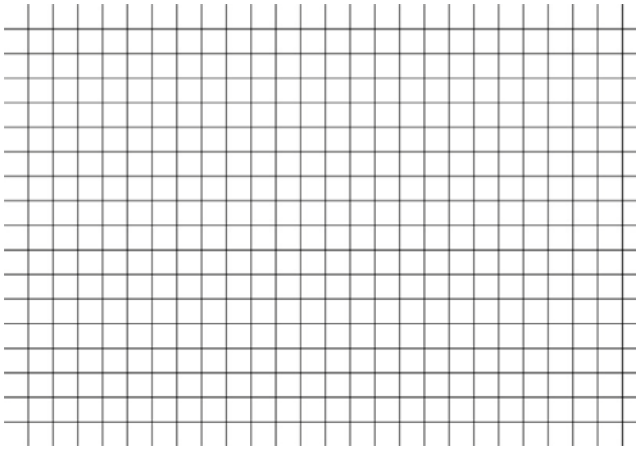
- Overall sharpness
- Centre to edge variation
- Barrel and pincushion distortion
- Diffraction limit
- Chromatic aberration
- Coma

Lens sharpness

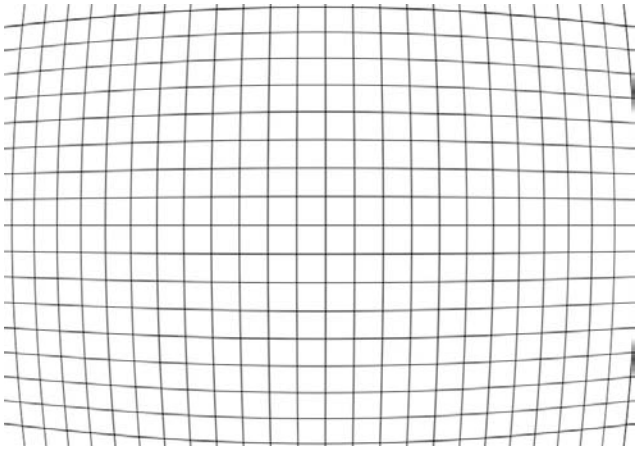
- Line pairs per mm



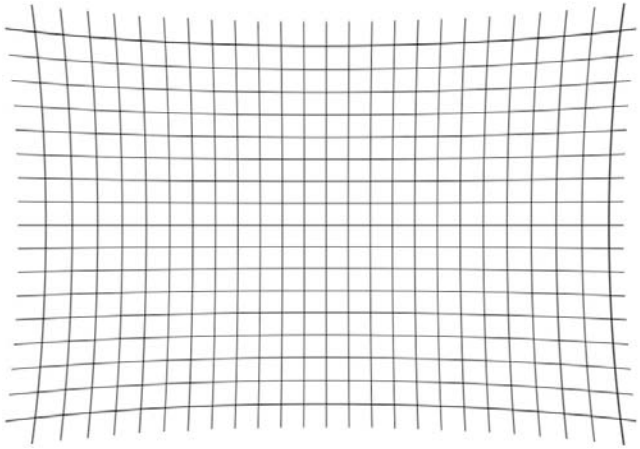
Barrel and Pincushion distortion



Original object

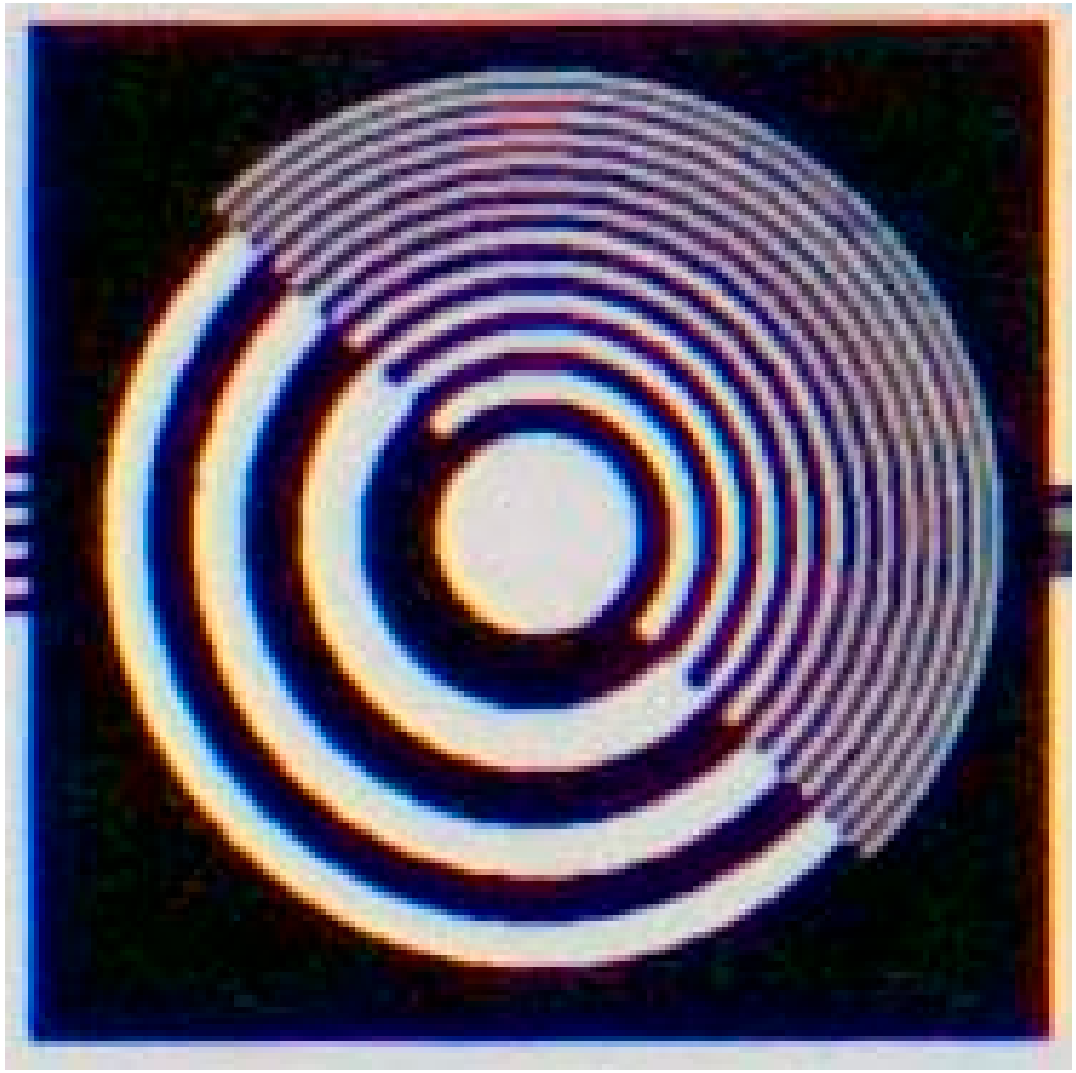


Barrel distortion

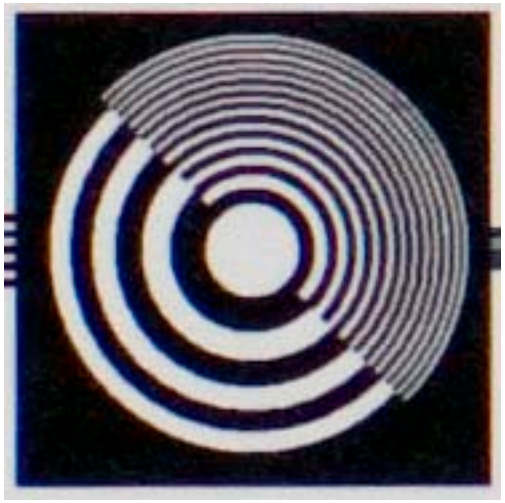


Pincushion distortion

Chromatic Aberration



Diffraction limit

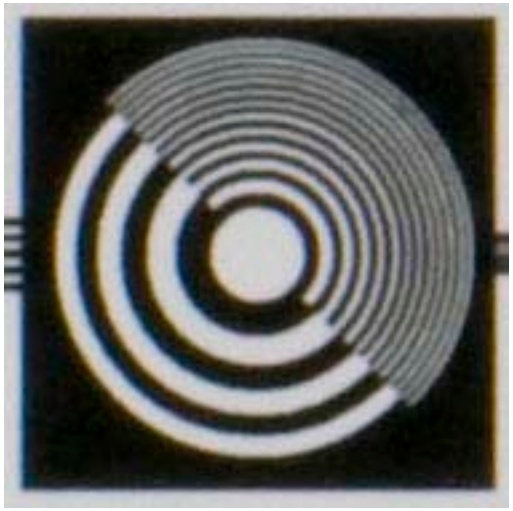


f/4

f/8

f/11

f/32

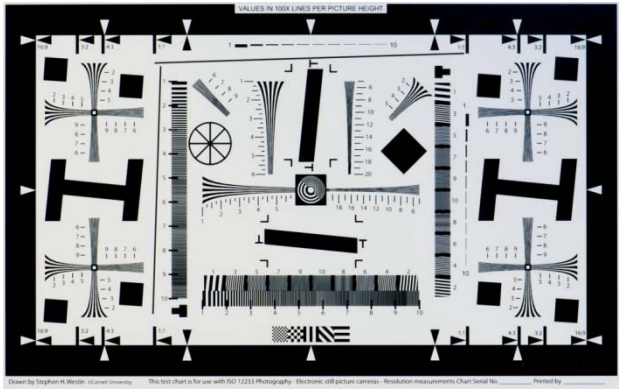


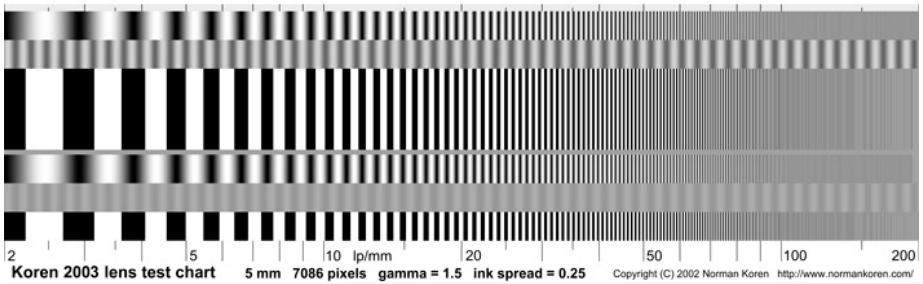
f/22

f/16

Making measurements

- One or more test charts
- Analysis software





Practicalities - I

- The image should be uniformly lit
- The camera should be on a tripod
- The image plane and the camera sensor must be co-planar
- The camera should be level with the centre of the image
- Ideally use a cable release or self timer
- Fill the frame with the image
- Look up the sensor size of your camera

Practicalities 2

- Find out your image sensor size

  Nikon half frame: 23.6 x 15.8

  Nikon full frame: 36.0 x 23.9

  Canon half frame: 22.2 x 14.8

  Canon full frame: 36.0 x 24.0

  Olympus 4/3 system: 17.3 x 13

- Align the test image so that the 0 on the hand drawn scale is centre field
- Move the camera to/from the target so that the LHS in the viewfinder (as measured on the hand drawn scale) corresponds to half the horizontal sensor size in mm.

Practicalities - 3

- Take images with your chosen lens at each f-stop so that you find out the sharpest aperture as well as get an idea of the diffraction limit.
- You can then read the resolution directly in lp/mm from the place in the image that the lines are no longer distinct.
- If you have a zoom lens, photograph the simple grid at several focal lengths. Barrel and pincushion distortions are usually very dependent on focal length.

Going further

http://www.normankoren.com

Look for “Lens testing”