

# Data Sheet

High-performance macro lens for scales from 1:4 to 4:1

## HR Digaron Macro 105 mm f/5.6

The Rodenstock **HR Digaron Macro 105 mm f/5.6** is a macro lens that offers exceptional sharpness and that was designed for the scale range from around 1:4 ( $B' = -0.25$ ) to 4:1 ( $B' = -4$ ). Unlike conventional macro lenses, it can be continuously optimized to any imaging scale from 1:3 ( $B' = -0.3$ ) to 3:1 ( $B' = -3$ ) using a ring with very fine scale divisions. An internal lens element group (floating elements) is shifted for a perfect matching of the optical design to the respective imaging scale. The lens therefore produces a high resolution, exceptional contrast, and a minimization of chromatic aberration (color fringes) unsurpassed in the macro sector.

The **HR Digaron Macro 105 mm f/5.6** has an image circle diameter of 82 mm over its total scale range. It can therefore be used with both technical cameras and system cameras of all professional sensor sizes. Even with very large sensor formats (36 x 56 mm and 40 x 54 mm) it still offers more than sufficient image circle reserves for camera movements such as parallel shift to avoid or to ameliorate converging lines and for a Scheimpflug lens tilt to extend the depth of field without excessive stopping down.

Since the special optical design does not permit an internal leaf shutter, the camera or the digital back has to have a mechanical focal-plane shutter or a sensor with an electronic shutter. Special adapters for the V groove interface are available for connecting to the different camera systems (adjustable technical cameras, digital SLR cameras and other system cameras). The V groove interface is an annular groove with a V-shaped cross-section close to the rear end of the mount (please see the illustration on the right side).

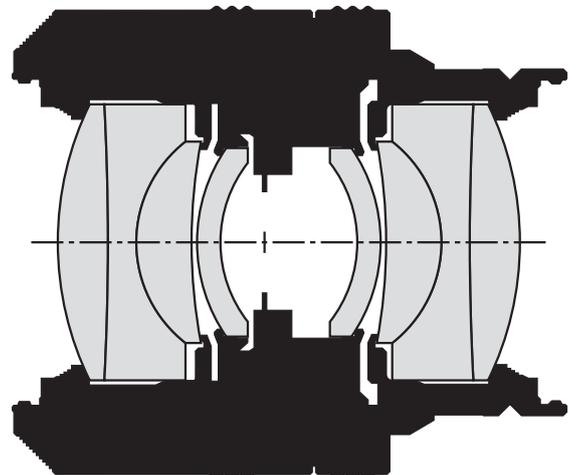
Focusing takes place by changing the lens distance from the sensor – using the bellows extension of technical cameras or using an interposed bellows or extension rings or better a helical focusing mount with other cameras.

Scale measurement cards are available for a precise determination of the imaging scale to be set to optimize the image quality. They are available to download as a PDF from the Rodenstock website for all relevant sensor sizes. The scale can alternatively be read off using the measured free working distance in a diagram (see middle of page 2). The large free working distance is also remarkable and at around 9 cm still allows good lighting even at a scale of 4:1.



### Data sheets

- ▶ [Formats, dimensions, shutter data](#)
- ▶ [Image circles, movement ranges](#)
- ▶ [Performance data 105 mm f/5.6 mm](#)



**Outstanding makro lens for all sensor formats up to 40x54 mm or 36x56 mm with adjustable optical image quality optimization by a rotatable magnification scale.**

# Rodenstock Photo Optics

a brand of the Qioptiq Photonics GmbH & Co. KG

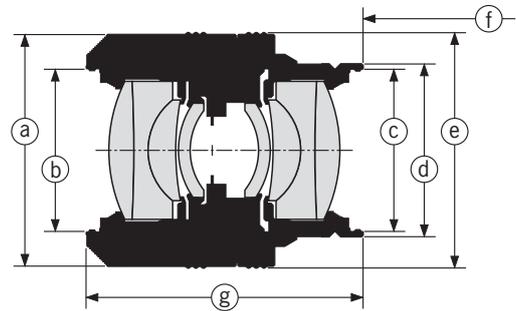
## HR Digaron Macro 105 mm f/5.6

### Dimensions and weight

Push-on mount diameter (a)	Filter thread (frontal) (b)	Filter thread (rear) (c)	Rear barrel diameter (d)	Maximum diameter (e)	Free distance <sup>1)</sup> from lens end (f)	Length (g)	Weight without adapter
61.6 mm	43 x 0.75	43 x 0.75	46.0 mm	62.6 mm	see scale below	96.4 mm	530 g

<sup>1)</sup> If related to the adapter flange the free distance varies according to the camera system

The connection of the lens to different camera systems is made by specific camera adapters using the V groove interface (an annular groove with a V-shaped cross-section close to the rear end of the mount). Because the special optical design of the lens does not permit a leaf shutter, the camera or the digital back has to have a focal-plane shutter or a sensor with an electronic shutter.



### Focusing range (free working distance) and flange focal length

The imaging quality of the HR Digaron Macro 105 mm f/5.6 can be individually optimized between the scales 1:3 ( $B' = -0.3$ ) and 3:1 ( $B' = -3$ ). With the rotating ring set to  $B' = -0.3$ , excellent results are assured up to 1:4 ( $B' = -0.25$ ) and good results are still possible up to infinity. The lens series HR Digaron-S and HR Digaron-W/SW that are optimized for the distance range only start to become better from a distance of around 0.5 m. The **recommended range of use** for the HR Digaron Macro 105 mm f/5.6 which is superior from a scale of 1:4 ( $B' = -0.25$ ) is therefore **from 1:4 ( $B' = -0.25$ ) up to 4:1 ( $B' = -4$ )**. The rotational ring should be set to the left hand end value  $B' = -0.3$  for scales below 1:3 and to the right hand end value  $B' = -3$  for scales above 3:1.

#### Free working distance [mm] between motif plane and the front end of the barrel

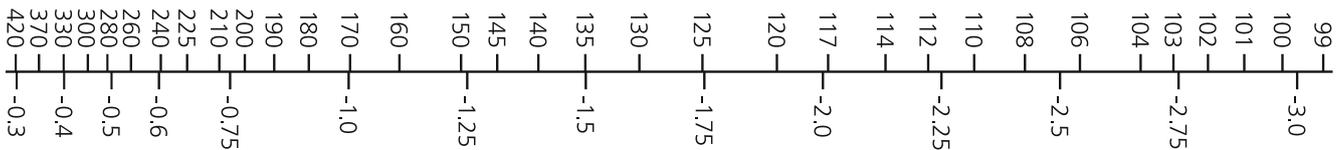


Image scale  $B'$  (to be set with the rotatable magnification scale ring)

#### Flange focal length $q$ [mm] from rear lens barrel end to sensor plane · Focusing occurs with camera bellows or extension rings

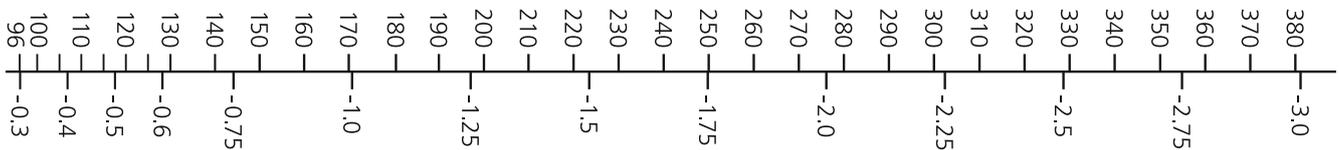


Image scale  $B'$  (to be set with the rotatable magnification scale ring)

**Even with the largest recommended magnification scale 4:1 ( $\beta = -4$ ) the free working distance remains still 90 mm and allows comfortable working and perfect illumination.**

## HR Digaron Macro 105 mm f/5.6

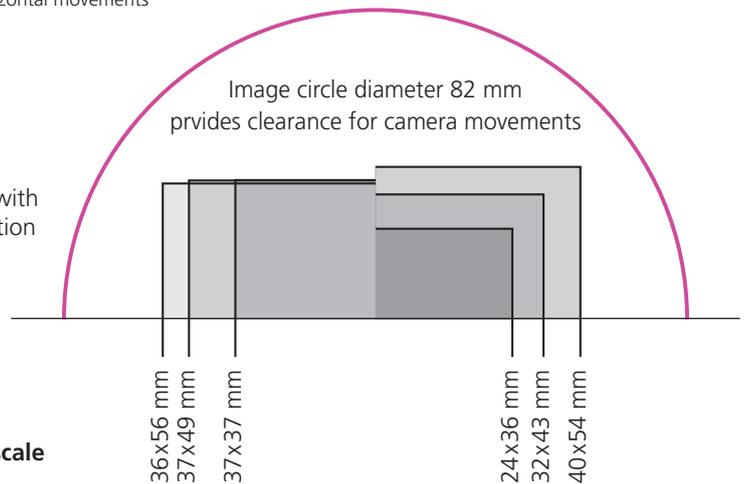
### Working apertures, image angles, image circles and movement ranges

Magnification scale given as $\beta'$	given as a ratio	Recommended working aperture	Image angle	Image circle diameter	Movement range [mm] vertical/horizontal (landscape format) <sup>2</sup>					
					24x36 mm	37x37 mm	33x44 mm	37x49 mm	36x56 mm	40x54 mm
-0.25	1:4	5.6-8	34.6°	82 mm	25 / 21	18 / 18	18 / 16	14 / 12	12 / 9	11 / 9
-0.5	1:2	5.6-8	29.1°	82 mm	25 / 21	18 / 18	18 / 16	14 / 12	12 / 9	11 / 9
-0.75	1:1.33...	5.6-8	25.1°	82 mm	25 / 21	18 / 18	18 / 16	14 / 12	12 / 9	11 / 9
-1.0	1:1	5.6-8	22.1°	82 mm	25 / 21	18 / 18	18 / 16	14 / 12	12 / 9	11 / 9
-2.0	2:1	5.6	14.8°	82 mm	25 / 21	18 / 18	18 / 16	14 / 12	12 / 9	11 / 9
-4.0	4:1	5.6	8.9°	82 mm	25 / 21	18 / 18	18 / 16	14 / 12	12 / 9	11 / 9

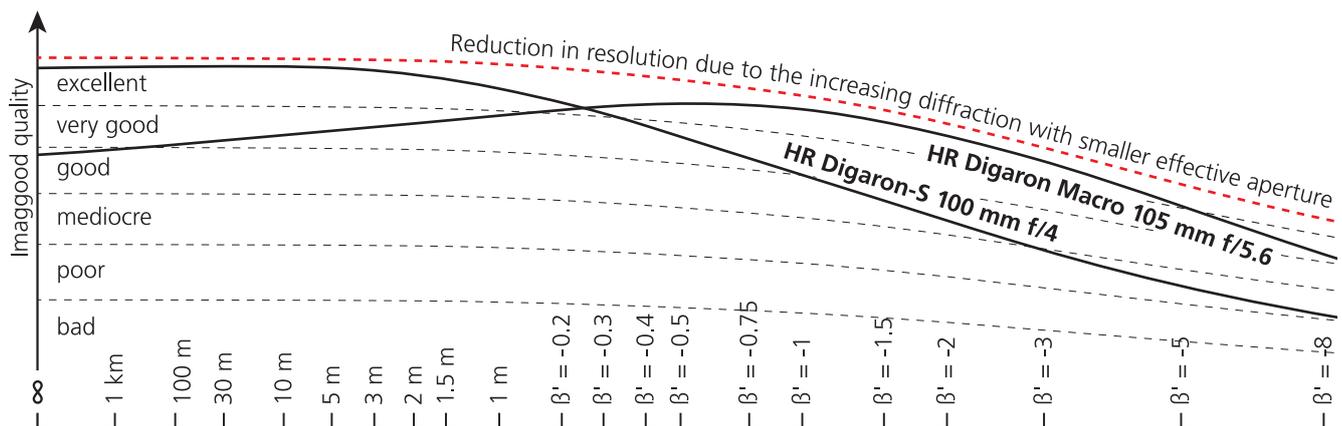
<sup>2</sup>) For portrait format the given values for the maximum vertical and horizontal movements have to be swapped

### Image circle in natural size

The image circle of the HR Digaron Macro 105 mm f/5.6 with a diameter of 82 mm can be used over the full magnification scale range from 1:4 ( $\beta' = -0.25$ ) to 4:1 ( $\beta' = -4$ ) and it provides a huge clearance for camera movements (shift and tilt) even with the largest digital sensor formats.

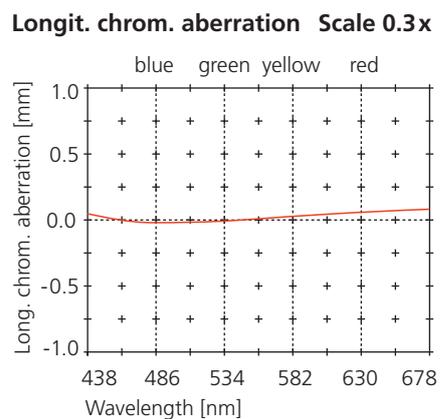
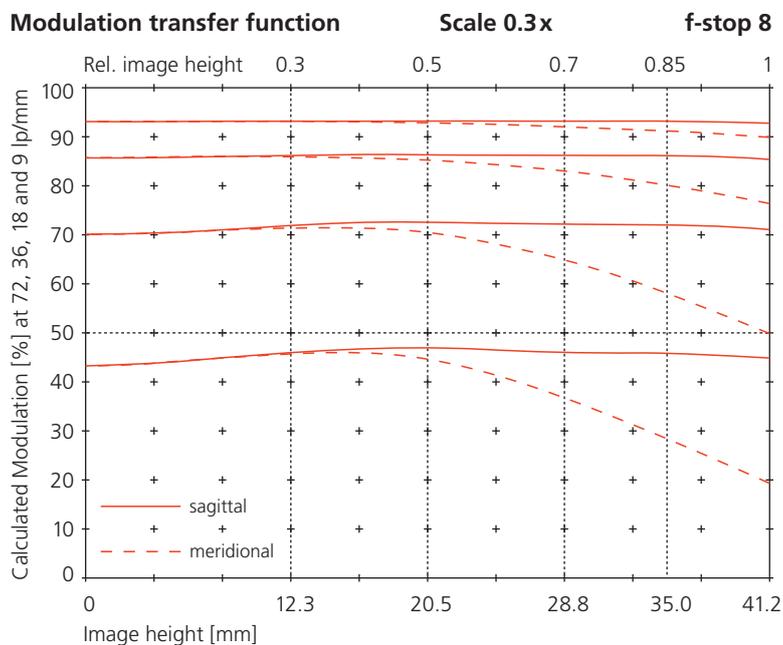
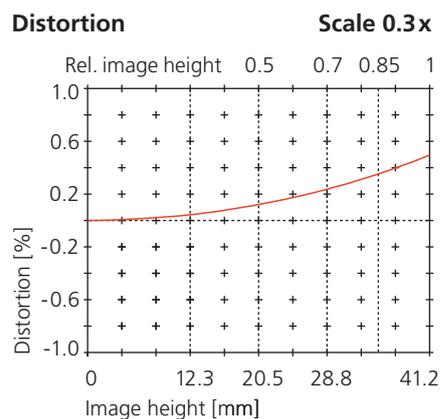
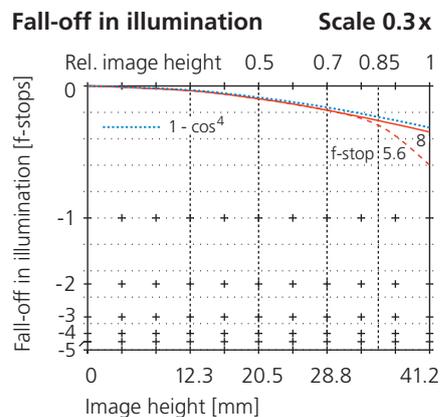
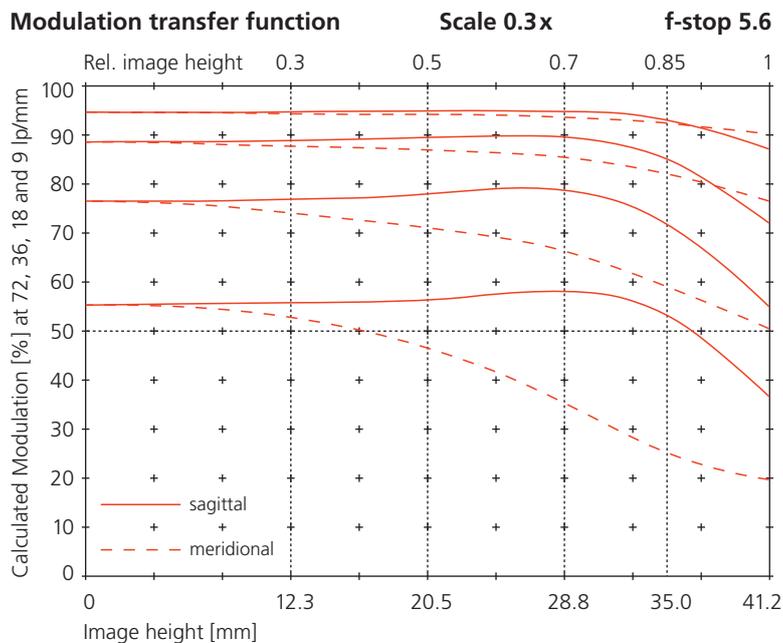


### The change in image quality over the magnification scale



The best digital lenses start to experience a drop in quality from an imaging scale of 1:4; this is where the recommended working range of the HR Digaron Macro begins.

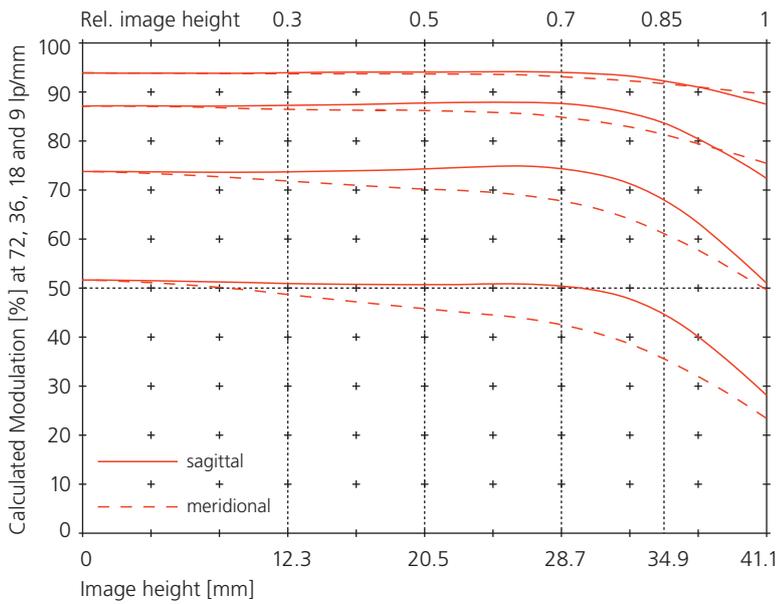
## HR Digaron Macro 105 mm f/5.6



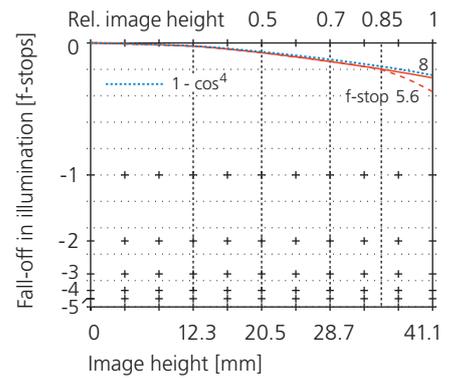
All spatial frequencies [line pairs/mm], image heights [mm] and scales are related to the film or sensor side

**HR Digaron Macro 105 mm f/5.6**

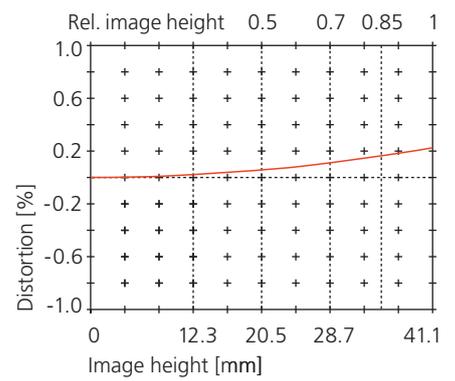
**Modulation transfer function Scale 0.5x f-stop 5.6**



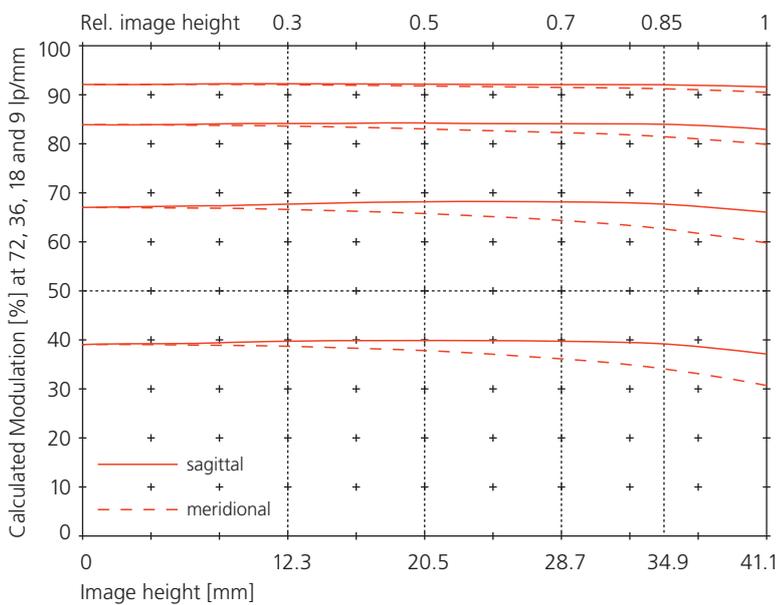
**Fall-off in illumination Scale 0.5x**



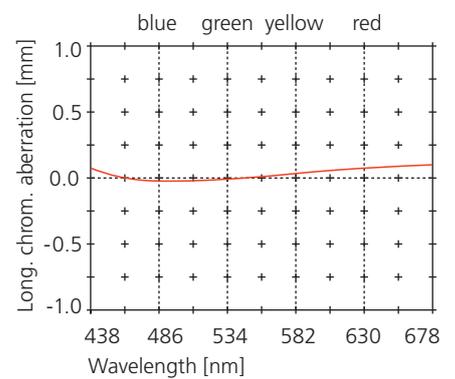
**Distortion Scale 0.5x**



**Modulation transfer function Scale 0.5x f-stop 8**

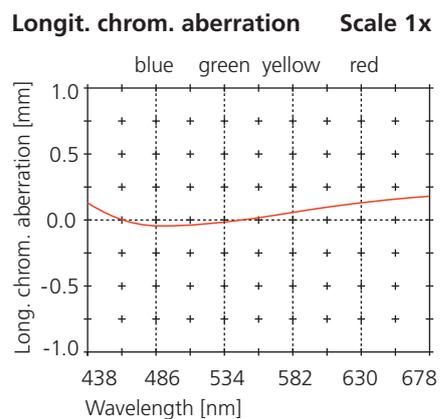
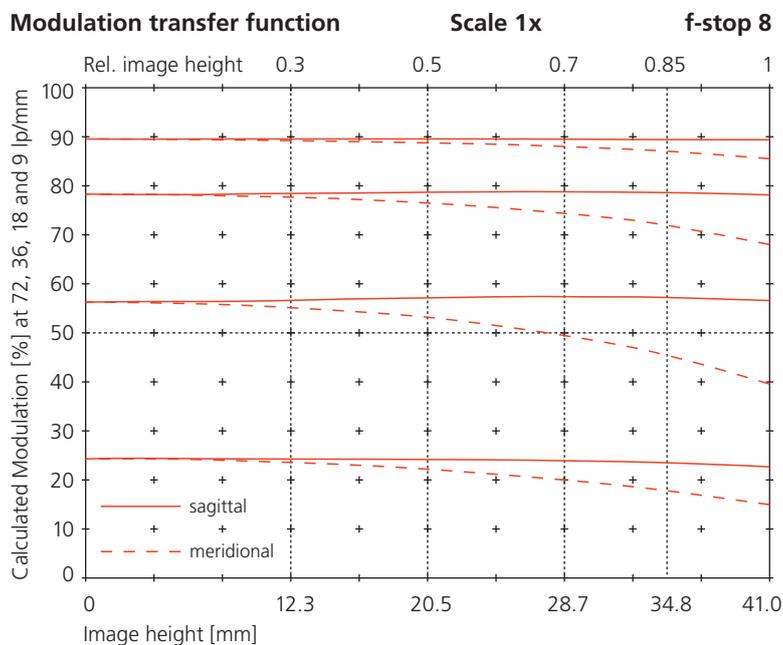
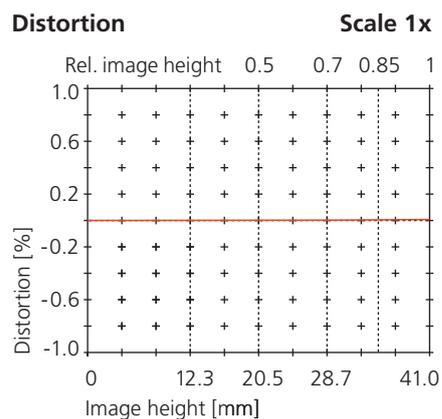
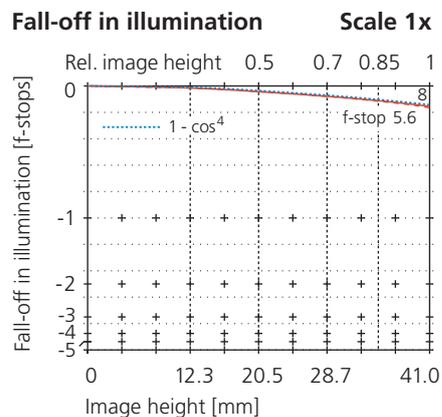
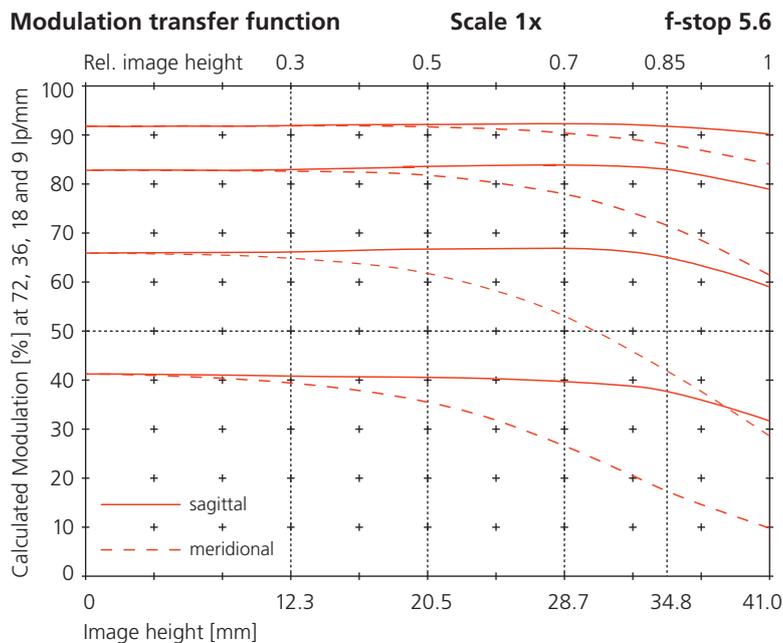


**Longit. chrom. aberration Scale 0.5x**



**All spatial frequencies [line pairs/mm],  
image heights [mm] and scales  
are related to the film or sensor side**

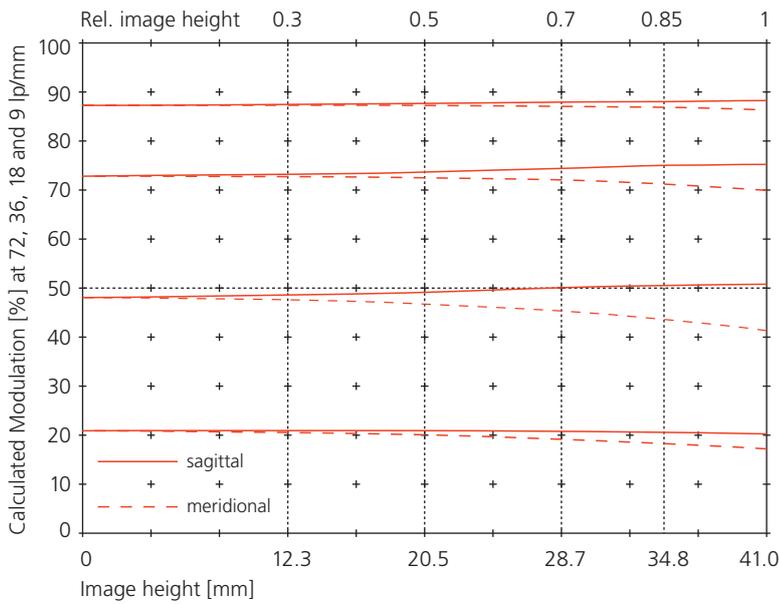
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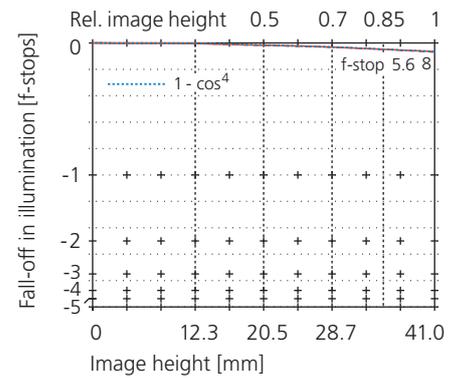
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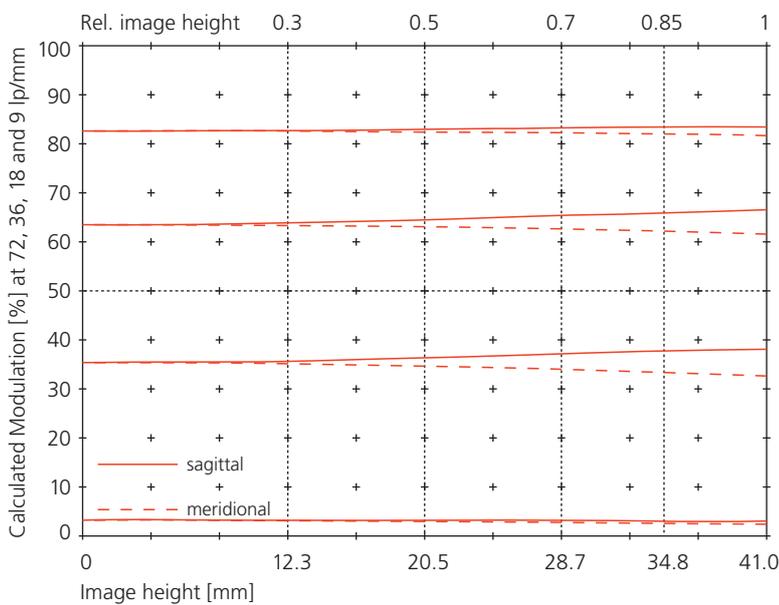
**Modulation transfer function**      **Scale 2x**      **f-stop 5.6**



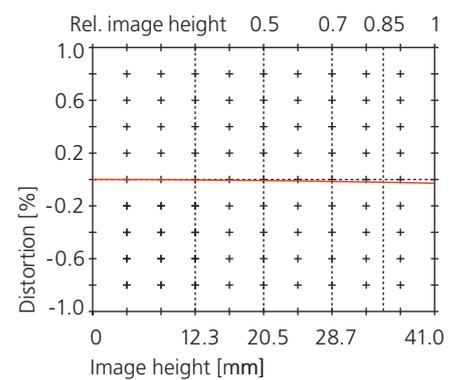
**Fall-off in illumination**      **Scale 2x**



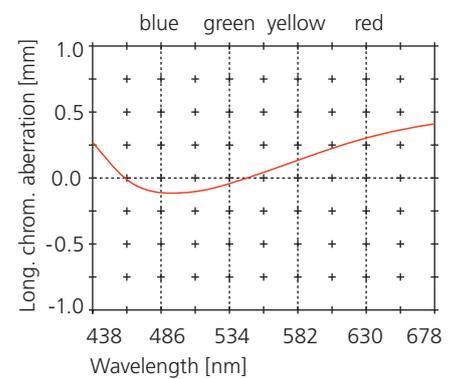
**Modulation transfer function**      **Scale 2x**      **f-stop 8**



**Distortion**      **Scale 2x**



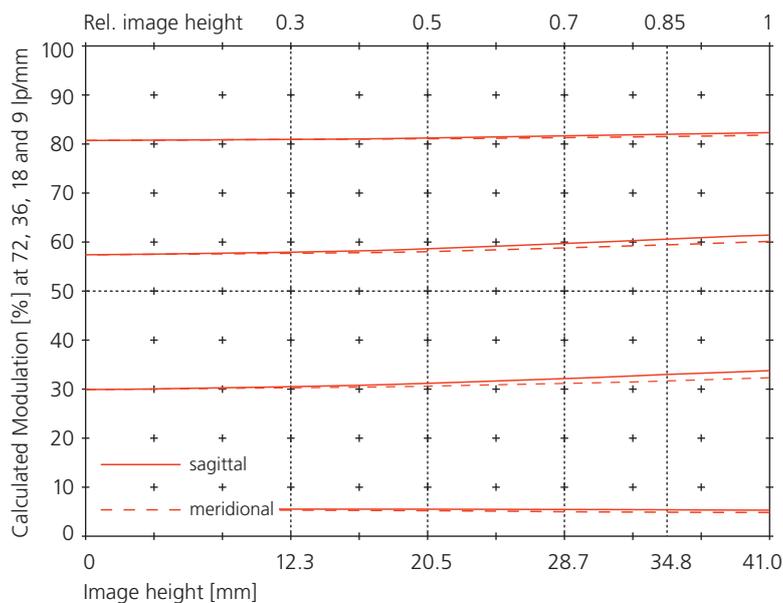
**Longit. chrom. aberration**      **Scale 2x**



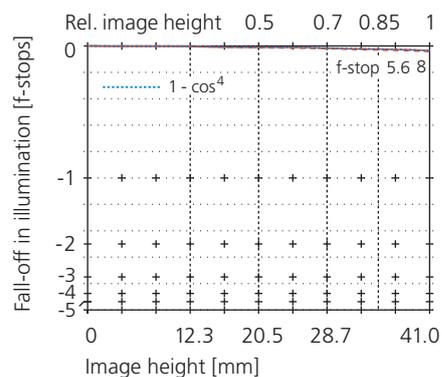
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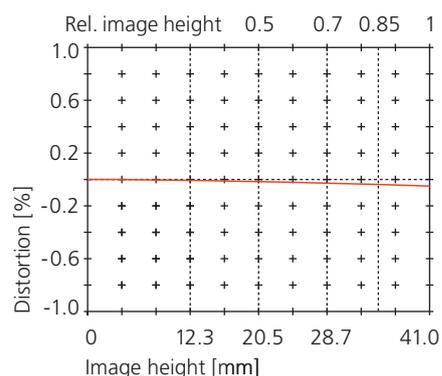
**Modulation transfer function** Scale 3x f-stop 5.6



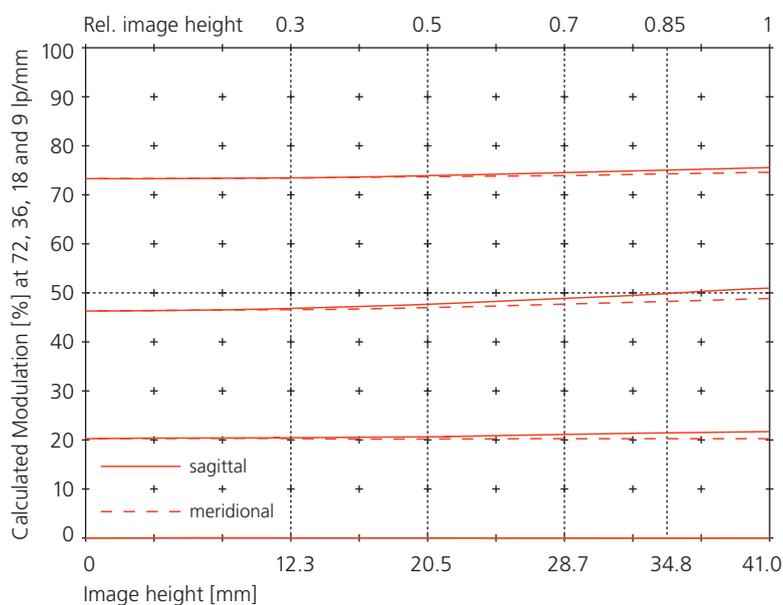
**Fall-off in illumination** Scale 3x



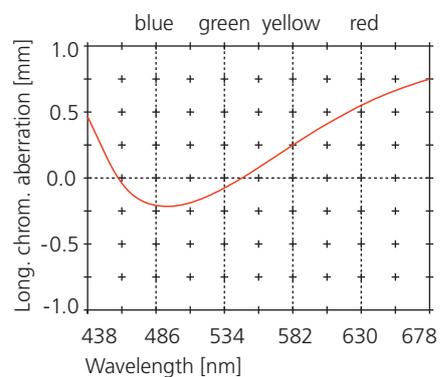
**Distortion** Scale 3x



**Modulation transfer function** Scale 3x f-stop 8



**Longit. chrom. aberration** Scale 3x



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