RODENSTOCK

Photo Optics
digital and analog

Lenses for digital and analog photography that meet the highest professional demands, quality filters and aspherical magnifiers

Go to:

- Digital Photography
- Analog prof. Photography
- Printing/CCD
- Quality Filters
- Aspherical Magnifiers

Photo Optics – digital and analog

These are some of the typical fields of application for our photo lenses, quality filters and aspherical magnifiers:

- Professional digital photography with high-resolution CCD line scanner backs and CCD/CMOS chip backs attached to technical cameras for perspective control by parallel shifts and/or extended depth of field by swing and tilt according to the Scheimpflug law as well as for industrial applications.
- Professional medium and large format photography with technical cameras for perspective control by parallel shifts and/or extended depth of field by swing and tilt according to the Scheimpflug law.
- Printing with amateur and professional enlargers, printers and vertical/horizontal reproduction cameras, duplication of transparencies, production of internegatives as well as industrial applications with CCD cameras.
- Blocking of impairing ultraviolet and/or infrared radiation, attenuation of bright light, reduction or avoidance of reflexions and correction of colors or their rendition in grey tones by high quality optical filters.
- Quality control of slides, transparencies, negatives, photographic enlagements and proof prints with distortion free aspherical magnifiers that provide best sharpness and are free from color fringes.

LINOS Photonics GmbH is the right partner for you for all these applications when you need standard optics, technical support and advice or if your application requests a customized development. Please contact us …

… if you need additional technical information,
… if you need technical support or
… if you need a customized solution.

For orders or if there are questions about availability or prices of our standard series products, please contact our local distributor(s) directly. You can find an address list with our LINOS distributors in Germany as well as in many other countries in Europe and overseas on our website.

Back to general overview

HR Digaron-S
HR Digaron-W
Apo-Sironar digital
Apo-Macro-Sironar digital

Accessories: Centerfilter
Accessories: Focus-Mount

Lenses for Digital Professional Photography

Digital photography with current lenses, cameras and digital backs is superior to conventional photography in almost every case: Digital photography is faster, cheaper for high photo quantities, it makes retouching easier, allows more effective manipulation and may have a higher quality. Furthermore, the results (digital files) can be transferred across largest distances extremely fast and cheap via the internet. However, it makes much higher demands on the image rendering quality of the lens because of the special technical requirements of the sensors (e.g. regular pixel grid, planar sensor surface and a 2 mm thick protective and filter glass plate in front of it) if the theoretically possible quality increase is to be realized in practice.

Lenses for adjustable technical cameras must offer really large image angles for perspective controls and lens swing and tilt and must ensure the very best imaging quality right up to their image circle margin. The resolving power and the contrast must be at their optimum even at large apertures (f-stop 8, when used with relatively small area sensors even from 5.6) to ensure that diffraction and color noise do not impair sharpness. Furthermore, the correction of curvature of field has to meet the highest demands because of the virtually perfectly planar sensor surface, and the lenses may not generate any color fringes or any visible distortion. All these demands are met by the Rodenstock lenses HR Digaron-S, HR Digaron-W, Apo-Sironar digital and Apo-Macro-Sironar digital.

- The HR Digaron-S lenses provide extremely high resolution already from open aperture (optimum: f-stop 4 to 5.6), perfectly corrected image curvature and a correction for the thickness of the sensor's protective glass. They are the best lenses for smaller sensors up to 33x44 mm or even up to 37x49 mm with a pixel pitch below 12 µm down to 5 µm.

- The HR Digaron-W lenses with a little bit smaller working aperture (optimum: f-stop 5.6 to 8 or 8 to 11) and a larger image circle diameter for sensors up to 40x54 mm provide almost the same extraordinary characteristics.

- Both lens series Apo-Sironar digital and Apo-Macro-Sironar digital (the latter is optimized for large scales) provide large image circles for substantial camera movements with digital scan backs and with chip backs being used in the macro-scan mode for larger formats by stitching multiple shots made with laterally shifted back from one shot to the next. Resolving power is designed for a pixel pitch down to 9 µm.

Rodenstock lenses provide you with best sharpness for highest resolution line and area sensors in order to get the full potential from this technology

Back to digital photography

HR Digaron-S
HR Digaron-W
Apo-Sironar digital
Apo-Macro-Sironar digital

Accessories: Centerfilter
Accessories: Focus-Mount

Lenses for Digital Professional Photography

HR Digaron-S

The Rodenstock HR Digaron-S lens series was developed for special applications with extremely high resolution CCD chip backs with pixel sizes noticeable smaller than 10 µm up to 5 µm such as can only be realized with smaller digital sensor formats. These lenses utilize every technological possibility to get as close as possible to the absolute physical limit of diffraction-determined resolution. Among other things, even the optical properties and the thickness of the CCD protective glass were taken into the equation of the optical correction.

The resolving power and lateral chromatic aberration have been optimized to ensure that the resulting lack of sharpness or the color fringes do not amount to any more than a tiny fraction of the pixel size (which can no longer be resolved). As a result, even when the digital photos taken with the lens are enlarged to a maximum on the screen, absolutely no color fringes are visible, unless color fringes are added by the pixel structure of the sensor's Bayer filter or due to interpolation.

The resolving power of the HR Digaron-S is not only a little better for the working apertures of 8 to 11 recommended for other high-performance lenses. You can rather see an increase in performance even with a higher aperture right up to the maximum f-stop 5.6 to 4. This increase is reflected in the very high brilliance and detail reproduction. To ensure that this fantastic quality is not impaired by diffraction, HR lenses should always be stopped down as little as possible. This means that the depth of field should be increased for motifs extended in depth by using an optimum lens tilt for an overall sharp focus.

The advantageous larger apertures available with these lenses also reduce color noise in the shadows.

HR Digaron-S	Max. recommended format	
23 mm f/5.6	33×44 mm	(37×49 mm *)
28 mm f/4.5	33×44 mm	(37×49 mm *)
35 mm f/4	33×44 mm	(37×49 mm *)
60 mm f/4	33×44 mm	(37×49 mm *)
100 mm f/4	33×44 mm	(37×49 mm *)
180 mm f/5.6	37×49 mm	

* Reduced movements available with this larger sensor format

Data sheets

Formats, dimensions, shutter data, image circles, movement ranges

Performance data HR Digaron-S 23 mm f/5,6

Performance data HR Digaron-S 28 mm f/4,5

Performance data HR Digaron-S 35 mm f/4

Performance data HR Digaron-S 60 mm f/4

Performance data HR Digaron-S 100 mm f/4

Performance data HR Digaron-S 180 mm f/5,6

Apo-Sironar digital HR: the optimum with a superior reserve in sharpness for high resolution digital backs

HR Digaron-S (former name: Apo-Sironar digital HR)

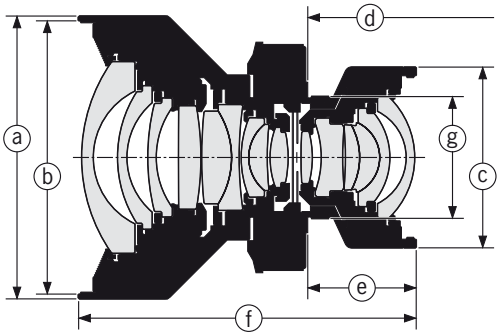
Back to lens description

Formats, shutter sizes, dimensions, weight

Lens	Maximum format	Shutter size	Push-on mount Ø ⓐ	Filter thread ⓑ	Rear barrel Ø ⓒ	Flange foc. length [1] ⓓ	Flange to lens end ⓔ	Overall length ⓕ	Weight w/Copal
23 mm f/5.6	33×44 mm	0	75 mm	M 72×0.75	48.0 mm	44.8 mm	28.8 mm	89.6 mm	580 g
28 mm f/4.5	33×44 mm	0	75 mm	M 72×0.75	48.0 mm	53.1 mm	36.7 mm	105.5 mm	830 g
35 mm f/4	33×44 mm	0	70 mm	M 67×0.75	48.0 mm	53.5 mm	29.2 mm	80.4 mm	480 g
60 mm f/4	33×44 mm	0	51 mm	M 49×0.75	42.0 mm	64.3 mm	24.0 mm	57.6 mm	240 g
100 mm f/4	33×44 mm	0	60 mm	M 58×0.75	42.0 mm	99.8 mm	22.1 mm	73.4 mm	370 g
180 mm f/5.6	37×49 mm	0	70 mm	M 67×0.75	60.0 mm	177.4 mm	40.6 mm	90.3 mm	425 g

[1]) With Copal shutter for scale 1:∞

All lenses of the HR Digaron-S series are available not only with the shutters given in the following table, but also with a normal mount (with 39 mm Leica thread) or alternatively with the "Focus-Mount" helical focuser.



Focusing range and flage focal length with Focus-Mount

Lens	Focusing range	Flange foc. length [1] ⓓ	Max. flange to lens end ⓔ
23 mm f/5.6	∞ – 0.25 m/ 0.8 ft	26.1 mm	10.1 mm
28 mm f/4.5	∞ – 0.3 m / 1.0 ft	34.4 mm	18.0 mm
35 mm f/4	∞ – 0.4 m / 1.3 ft	34.8 mm	10.5 mm
60 mm f/4	∞ – 0.7 m / 2.0 ft	45.6 mm	5.3 mm
100 mm f/4	∞ – 1.8 m / 6.0 ft	80.1 mm	3.4 mm
180 mm f/5.6	∞ – 4.0 m / 13.0 ft	158.7 mm	21.9 mm

Using digital lenses on cameras without bellows such as shift or panoramic cameras requires the use of a focusing facility. For this purpose, the Focus-Mount can be combined with all Rodenstock lenses in Copal shutter size 0. Existing lenses can be installed at a later date by the manufacturer.

[1]) With Copal shutter for scale 1:∞

Continuation performance data

Shutter data

Shutter type and size	Shutter speeds range	Manual cocking	Self cocking	Mechanical	Electronic	X-synchronized	Smallest f-stop increments	Screw thread ⓖ	Lens board opening	Lens board thickness	Accessories required
Copal 0	B, T, 1/500 s … 1 s	•		•		•		M 32.5×0.5	34.8 mm	1.5 … 4 mm	
Copal Press 0	B, 1/125 s … 1 s		•	•		•		M 32.5×0.5	34.8 mm	1.5 … 3 mm	
Prontor Magn. 0	B, 1/125 s … 32 s				•	•		M 32.5×0.5	34.8 mm	1.5 … 4 mm	Control Unit
Rollei Electron. 0	B, 1/500 s … 30 s				•	•	1/10	M 39×0.75	41.8 mm	1.5 … 3 mm	Control Unit

These lenses provide outstanding image quality thanks to a refined lens design with a large number of lens elements

HR Digaron-S (former name: Apo-Sironar digital HR)

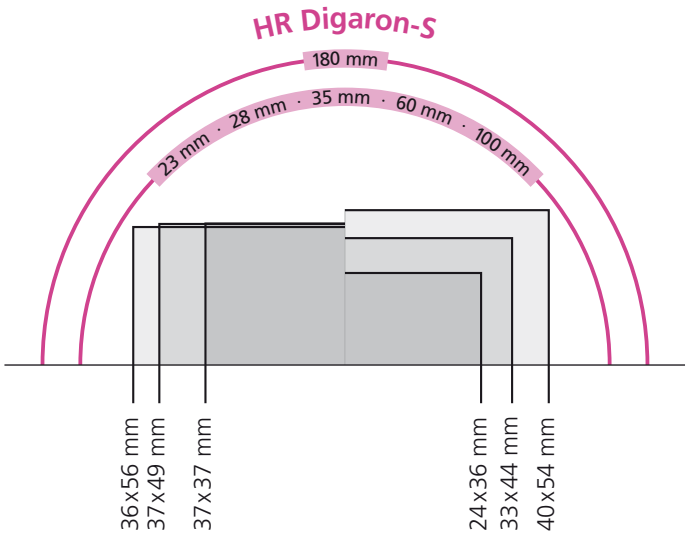
Back to lens description

Working apertures, image angles, image circles and movement ranges

Lens	Ref. Image scale	Recomm. Working f-stop	Image angle	Image circle diameter	Movement range [mm] 2) vertical/horizontal (landscape format)					
					24×36 mm	37×37 mm	33×44 mm	37×49 mm	36×56 mm	40×54 mm
23 mm f/5.6	1:∞	5.6-8	112°	70 mm	18 / 15	11 / 11	11 / 9	7 / 5	3 / 2	2 / 2
28 mm f/4.5	1:∞	5.6-8	101°	70 mm	18 / 15	11 / 11	11 / 9	7 / 5	3 / 2	2 / 2
35 mm f/4	1:∞	5.6	90°	70 mm	18 / 15	11 / 11	11 / 9	7 / 5	3 / 2	2 / 2
60 mm f/4	1:∞	5.6	60°	70 mm	18 / 15	11 / 11	11 / 9	7 / 5	3 / 2	2 / 2
100 mm f/4	1:∞	5.6	39°	70 mm	18 / 15	11 / 11	11 / 9	7 / 5	3 / 2	2 / 2
180 mm f/5.6	1:∞	5.6-8	25°	80 mm	24 / 20	17 / 17	17 / 14	13 / 11	11 / 8	9 / 8

2) These values apply to the recommended working aperture at the given scale; with increasing scale, image circle and movement ranges increase

Image circles (original size)



The lenses HR Digaron-S with focal lengths up to 100 mm are recommended for use with sensor formats larger than appr. 37x49 mm only if no larger camera movements are needed.

If larger camera movements are needed for correcting converging lines or for lens swing and tilt (according to the Scheimpflug rule) with sensor formats of 37x49 mm or larger then the new line of Rodenstock lenses HR Digaron-W with image circle diameters from 90 mm upwards should be used.

The large image circle allows large camera movements with all current sensor formats at least up to 33x44 mm

HR Digaron-S 23 mm f/5.6

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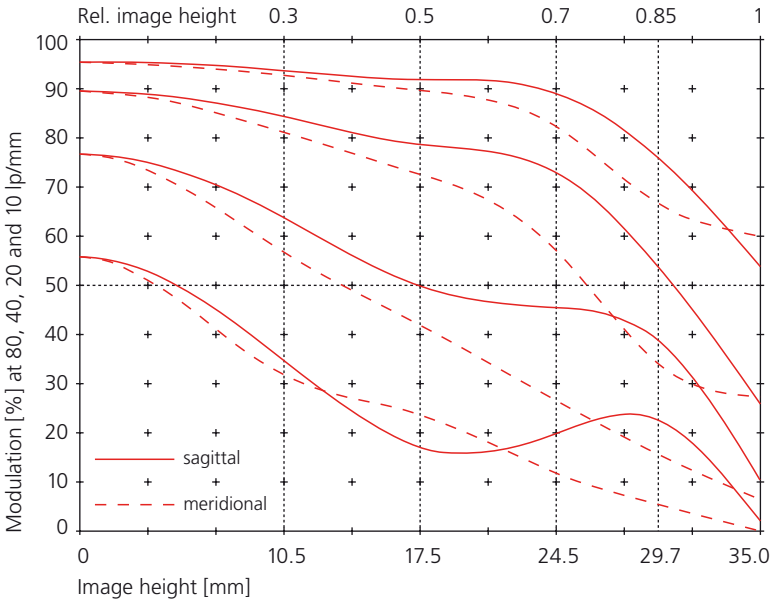
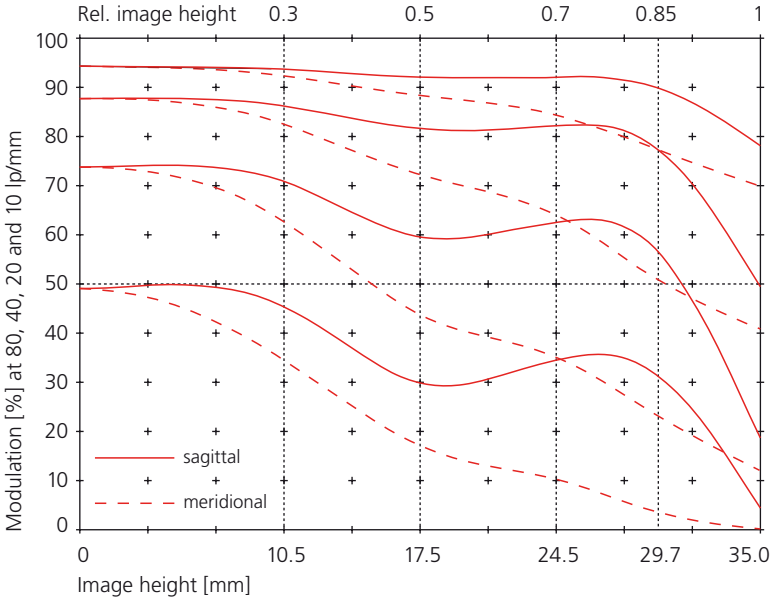
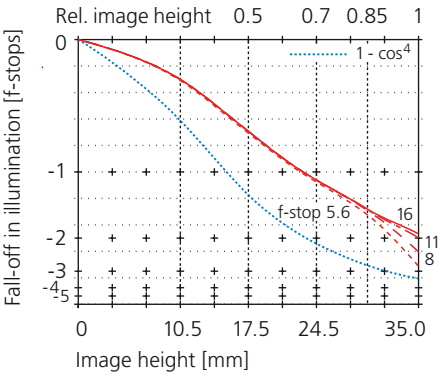
Modulation transfer function **Scale 0x** **f-stop 5.6**



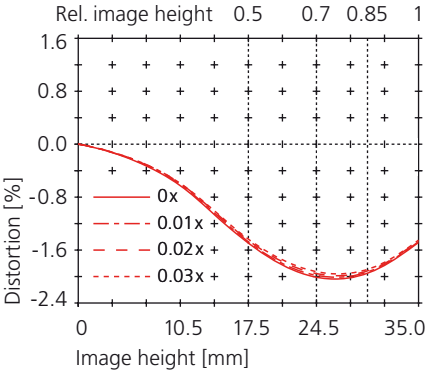
Modulation transfer function **Scale 0x** **f-stop 8**



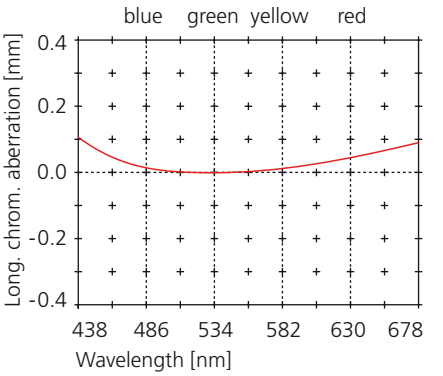
Fall-off in illumination **Scale 0x**



Distortion **Scale 0x ... 0.03x**



Long. chrom. aberration **Scale 0x**



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

HR Digaron-S 28 mm f/4.5

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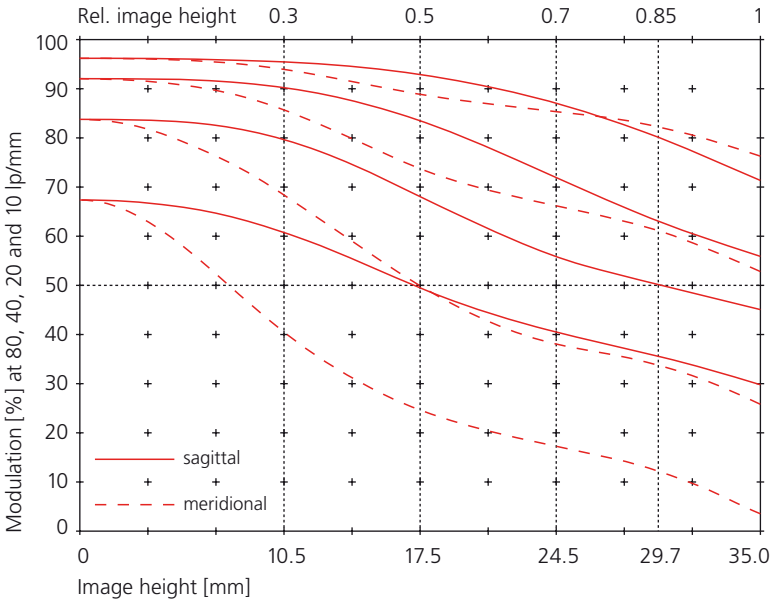
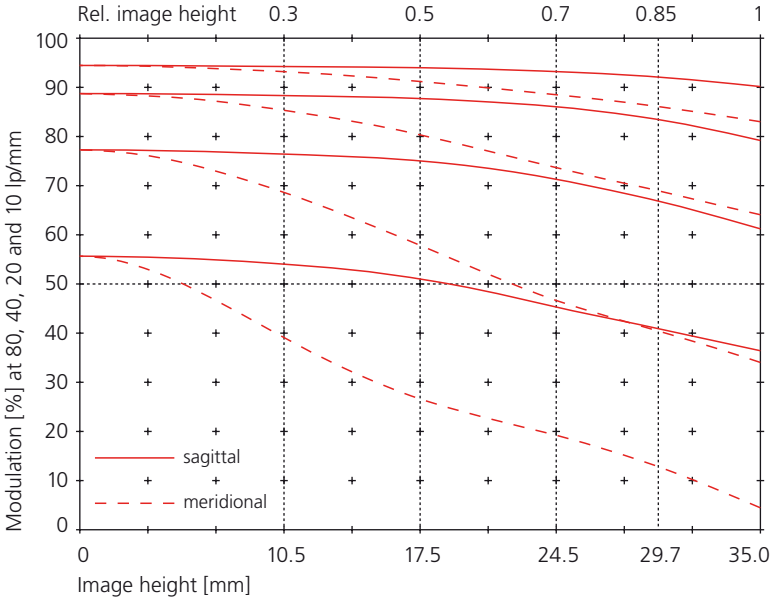
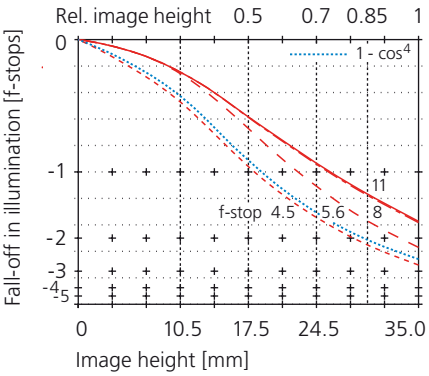
Modulation transfer function **Scale 0.01x** **f-stop 5.6**



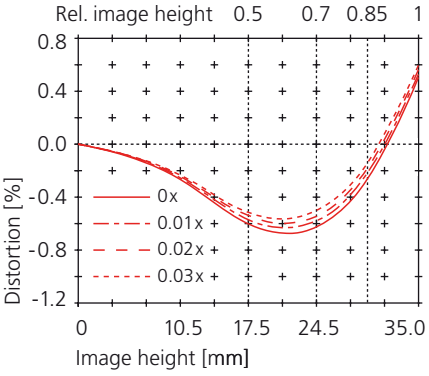
Modulation transfer function **Scale 0.01x** **f-stop 8**



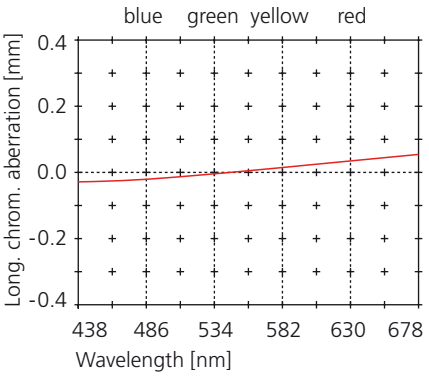
Fall-off in illumination **Scale 0.01x**



Distortion **Scale 0x ... 0.03x**



Long. chrom. aberration **Scale 0.01x**



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

HR Digaron-S 35 mm f/4

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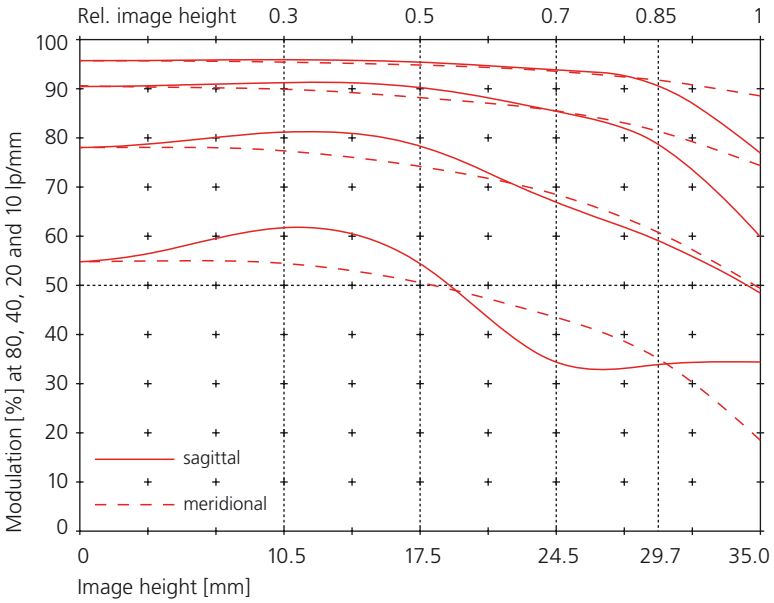
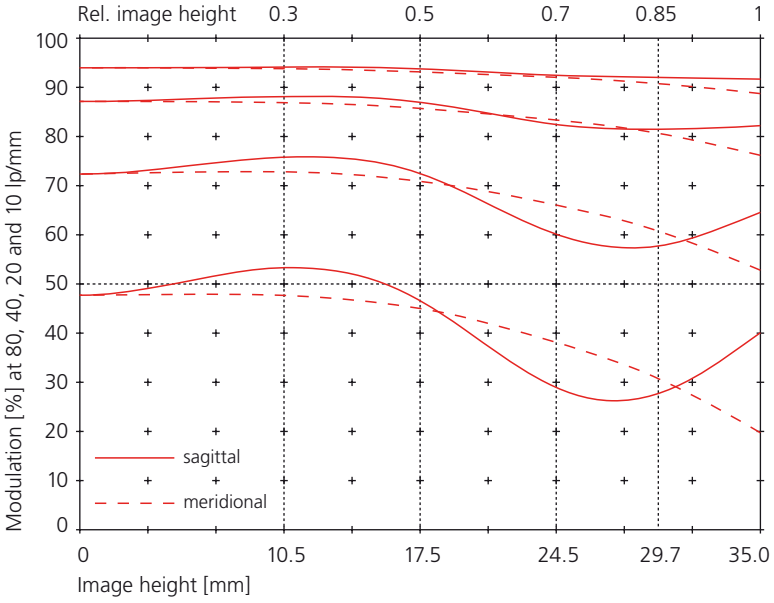
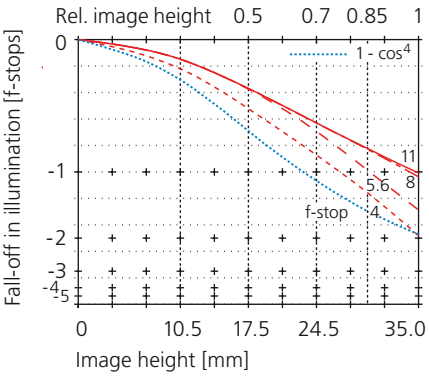
Modulation transfer function **Scale 0.02x** **f-stop 5.6**



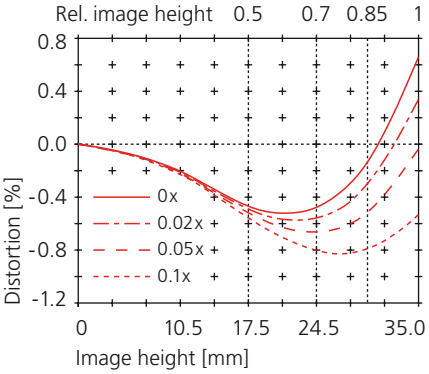
Modulation transfer function **Scale 0.02x** **f-stop 8**



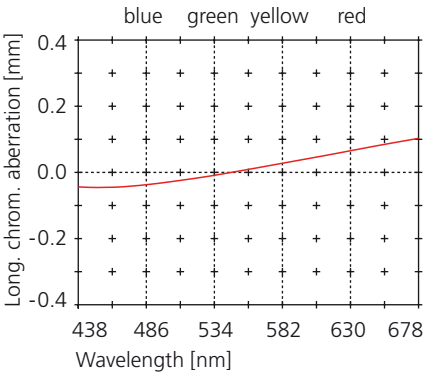
Fall-off in illumination **Scale 0.02x**



Distortion **Scale 0x ... 0.1x**



Long. chrom. aberration **Scale 0.02x**



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

HR Digaron-S 60 mm f/4

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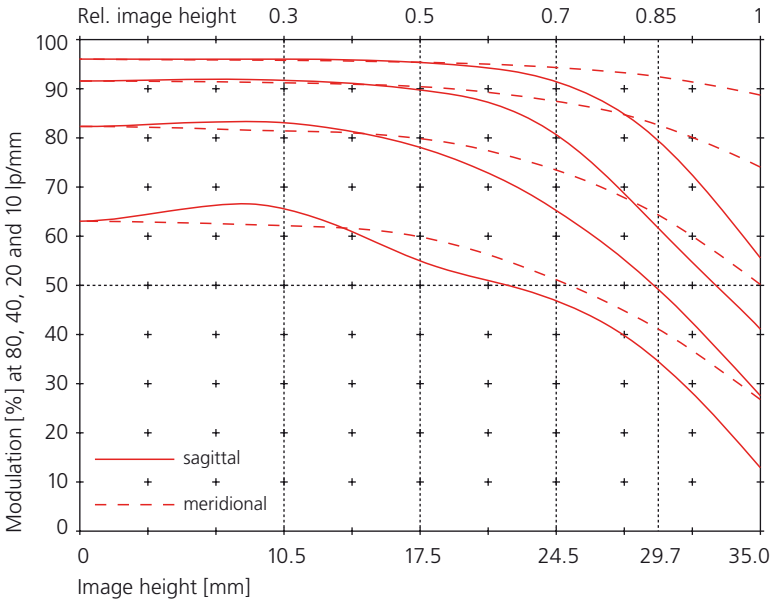
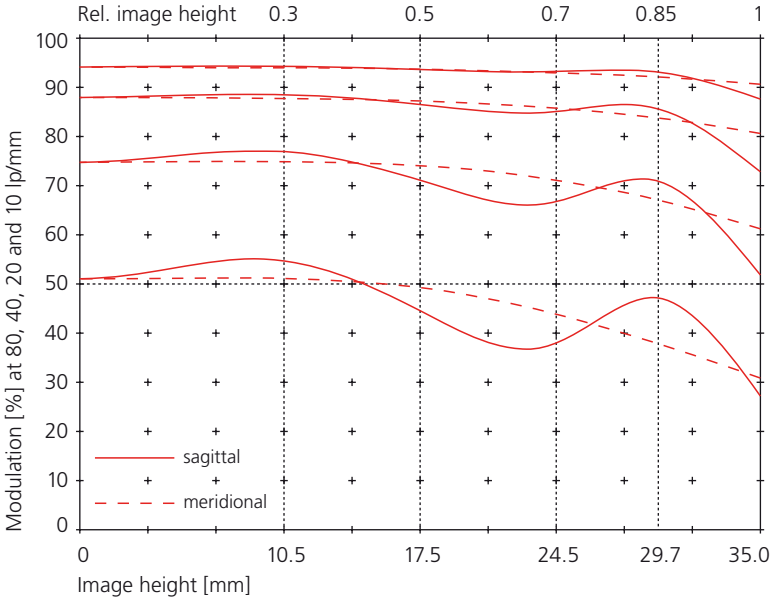
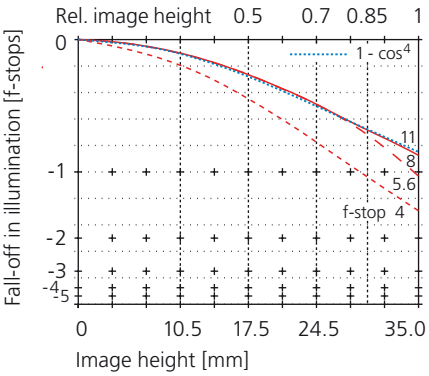
Modulation transfer function **Scale 0.03x** **f-stop 5.6**



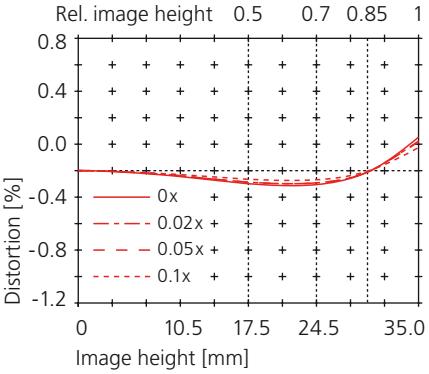
Modulation transfer function **Scale 0.03x** **f-stop 8**



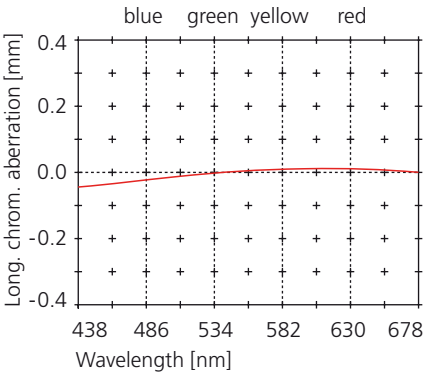
Fall-off in illumination **Scale 0.03x**



Distortion **Scale 0x ... 0.1x**



Long. chrom. aberration **Scale 0.03x**



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

HR Digaron-S 100 mm f/4

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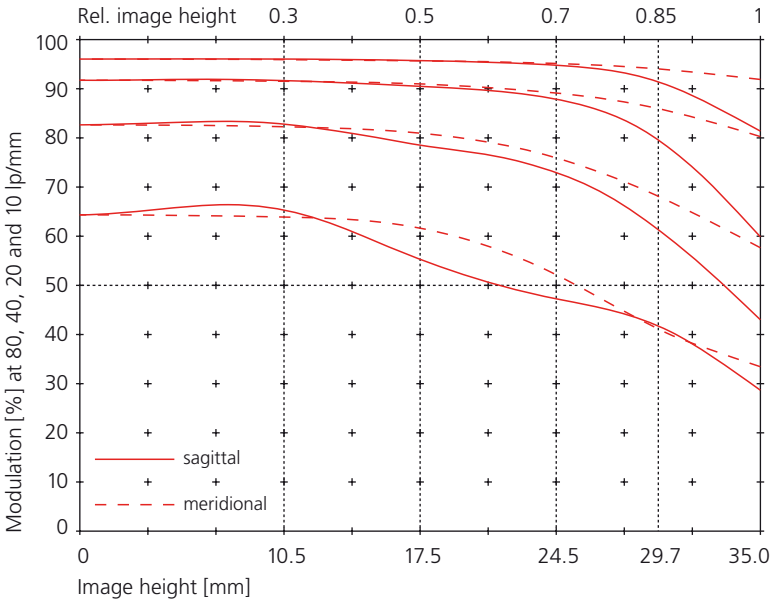
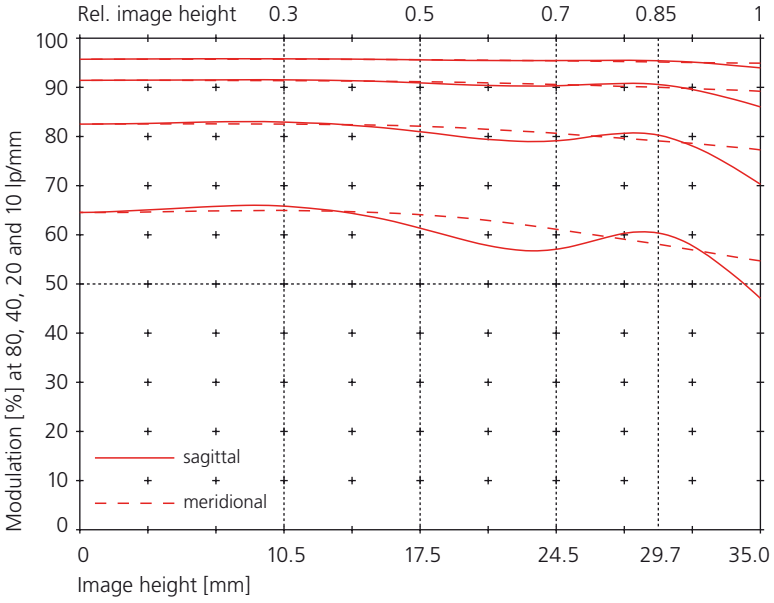
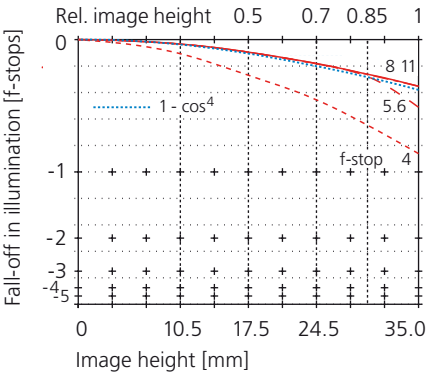
Modulation transfer function **Scale 0.05x** **f-stop 5.6**



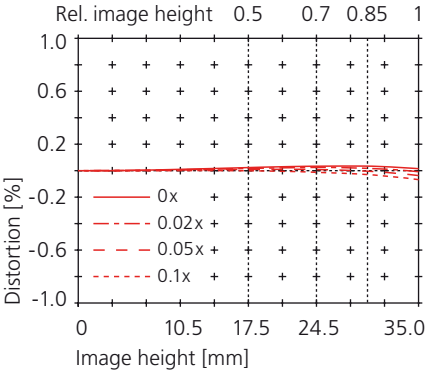
Modulation transfer function **Scale 0.05x** **f-stop 8**



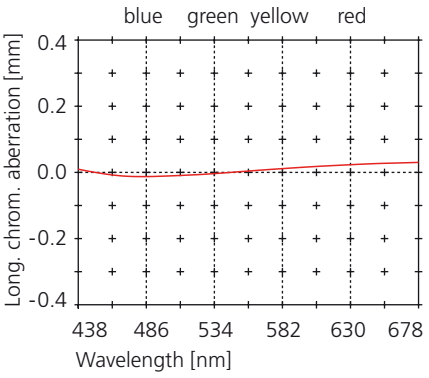
Fall-off in illumination **Scale 0.05x**



Distortion **Scale 0x ... 0.1x**



Long. chrom. aberration **Scale 0.05x**



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

HR Digaron-S 180 mm f/5.6

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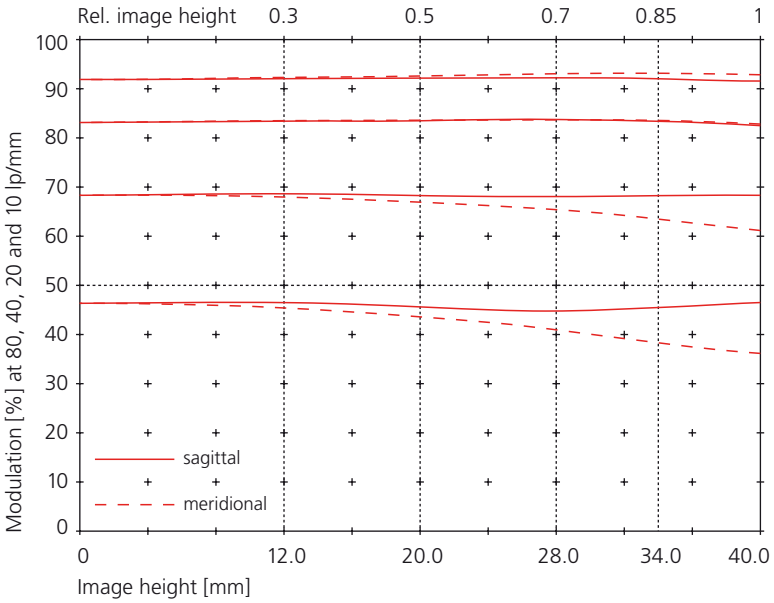
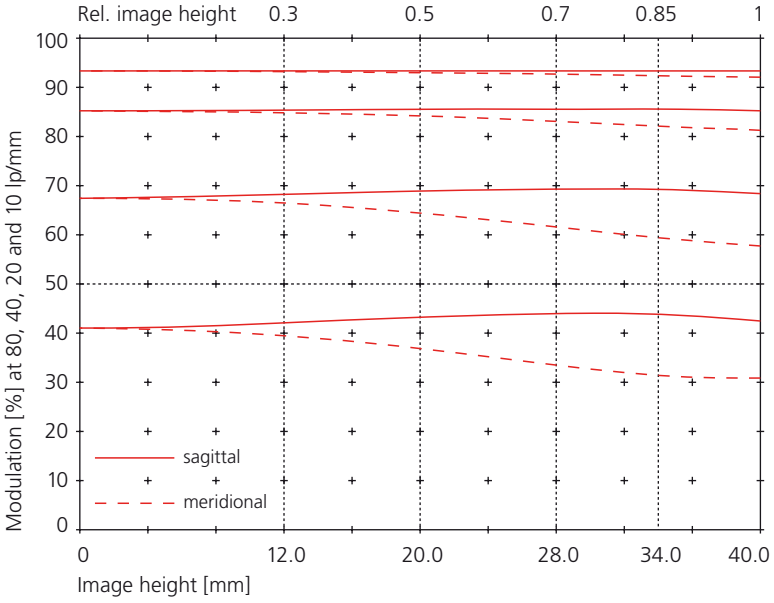
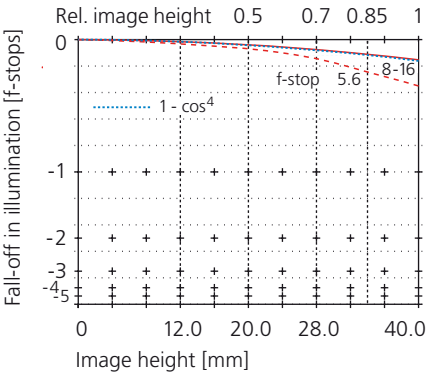
Modulation transfer function Scale 0.08x f-stop 5.6



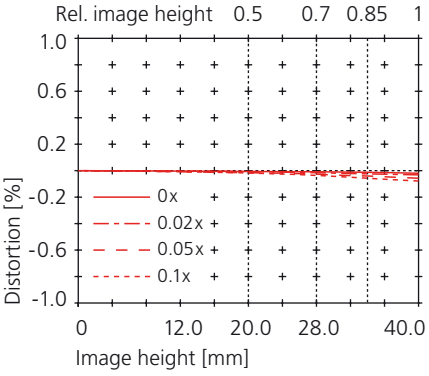
Modulation transfer function Scale 0.08x f-stop 8



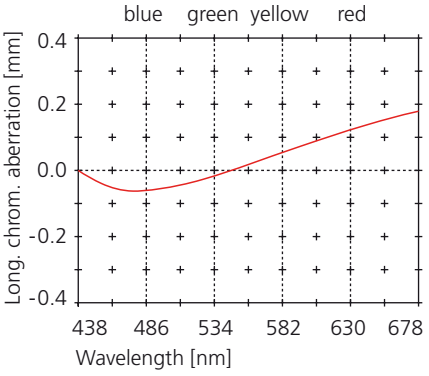
Fall-off in illumination Scale 0.08x



Distortion Scale 0x ... 0.1x



Long. chrom. aberration Scale 0.08x



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

Back to digital photography

HR Digaron-S
HR Digaron-W
Apo-Sironar digital
Apo-Macro-Sironar digital

Accessories: Centerfilter
Accessories: Focus-Mount

Lenses for Digital Professional Photography

HR Digaron-W

The pixel size of the sensors of digital camera backs cannot be reduced just as one likes for achieving higher resolution without a significant increase of image noise and a reduction of exposure latitude. This is the reason why larger sensors with a resolution up to about 60 megapixels have been developed for professional digital backs. However, digital lenses with image circle diameters of about 70 mm designed for smaller sensors do not allow sufficient or even any camera movements. This is why the new Rodenstock lens series HR Digaron-W with larger image circles from 90 mm on and with an extremely high resolution very close to the physical limit of diffraction has been developed. This new lens series comprises the focal lengths of 40 mm, 50 mm, 70 mm and 90 mm. The last mentioned two lenses are the renamed former Apo-Sironar digital 70 mm f/5.6 and Apo-Sironar digital 90 mm f/5.6 which both had already been calculated according to the much higher demands on freedom from aberrations for higher resolution with larger working apertures (reduced stopping down).

The shorter focal length of wide-angle lenses causes larger light incident angles at the margin of the image. This results in some blur because of astigmatism, spherical aberration and color fringes produced by the protection glass of a thickness of approx. 2 mm in front of the light-sensitive sensor plane. This can be visible with high resolution sensors. Therefore, the optical effects of this glass plate have been taken into consideration for the calculation of the lenses HR Digaron-W 40 mm f/4, 50 mm f/4 and 70 mm f/5.6.

A remarkable feature of the HR Digaron-W 40 mm f/4 (with a focal length equivalent to 26.5 mm for 35 mm format) is the long back focal length of approx. 25 mm. It leaves free space for shift and tilt movements between the rear mount and the sensor to avoid touching it or the rear standard. A flange focal length of approx. 70 mm allows focusing at infinity with a flat lens board and permits the use of the Rollei Electronic shutter.

HR Digaron-W	Max. recommended format
40 mm f/4	40×54 mm
50 mm f/4	40×54 mm
70 mm f/5.6	40×54 mm
90 mm f/5.6	72×96 mm

Data sheets

Formats, dimensions, shutter data, image circles, movement ranges

Performance data HR Digaron-W 40 mm f/4

Performance data HR Digaron-W 50 mm f/4

Performance data HR Digaron-W 70 mm f/5.6

Performance data HR Digaron-W 90 mm f/5.6

HR Digaron-W: after all, we can really take advantage of the extremely high resolution of the new large sensors

HR Digaron-W (former name: Apo-Sironar digital)

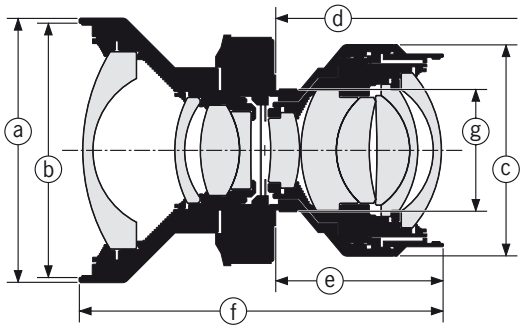
Back to lens description

Formats, shutter sizes, dimensions, weight

Lens	Maximum format	Shutter size	Push-on mount Ø ⓐ	Filter thread ⓑ	Rear barrel Ø ⓒ	Flange foc. length [1] ⓓ	Flange to lens end ⓔ	Overall length ⓕ	Weight w/Copal
40 mm f/4	40×54 mm	0	70 mm	M 67 × 0.75	56.0 mm	69.5 mm	44.4 mm	96.4 mm	530 g
50 mm f/4	40×54 mm	0	70 mm	M 67 × 0.75	51.0 mm	76.0 mm	44.3 mm	98.4 mm	550 g
70 mm f/5.6	40×54 mm	0	60 mm	M 58 × 0.75	48.0 mm	72.7 mm	23.6 mm	72.8 mm	340 g
90 mm f/5.6	72×96 mm	0	70 mm	M 67 × 0.75	60.0 mm	93.1 mm	33.2 mm	82.0 mm	460 g

[1]) With Copal shutter for scale 1:∞

All lenses of the HR Digaron-W series are available not only with the shutters given in the following table, but also with a normal mount (with 39 mm Leica thread) or alternatively with the "Focus-Mount" helical focuser.



Focusing range and flage focal length with Focus-Mount

Lens	Focusing range	Flange foc. length [1] ⓓ	Max. flange to lens end ⓔ
40 mm f/4	∞ – 0.5 m / 1.6 ft	50.8 mm	10.1 mm
50 mm f/4	∞ – 0.8 m / 2.6 ft	57.3 mm	25.6 mm
70 mm f/5.6	∞ – 0.8 m / 2.6 ft	54.0 mm	4.9 mm
90 mm f/5.6	∞ – 1.3 m / 5.0 ft	74.4 mm	14.5 mm

Using digital lenses on cameras without bellows such as shift or panoramic cameras requires the use of a focusing facility. For this purpose, the Focus-Mount can be combined with all Rodenstock lenses in Copal shutter size 0. Existing lenses can be installed at a later date by the manufacturer.

[1]) With Copal shutter for scale 1:∞

Continuation performance data

Shutter data

Shutter type and size	Shutter speeds range	Manual cocking	Self cocking	Mechanical	Electronic	X-synchronized	Smallest f-stop increments	Screw thread ⓖ	Lens board opening	Lens board thickness	Accessories required
Copal 0	B, T, 1/500 s … 1 s	•		•		•		M 32.5 × 0.5	34.8 mm	1.5 … 4 mm	
Copal Press 0	B, 1/125 s … 1 s		•	•		•		M 32.5 × 0.5	34.8 mm	1.5 … 3 mm	
Prontor Magn. 0	B, 1/125 s … 32 s				•	•		M 32.5 × 0.5	34.8 mm	1.5 … 4 mm	Control Unit
Rollei Electron. 0	B, 1/500 s … 30 s				•	•	1/10	M 39 × 0.75	41.8 mm	1.5 … 3 mm	Control Unit

The new lens series HR Digaron-W has been optimized for the larger sensor formats providing highest resolution up to 60 megapixels with a pixel pitch around only 6 µm

HR Digaron-W (former name: Apo-Sironar digital)

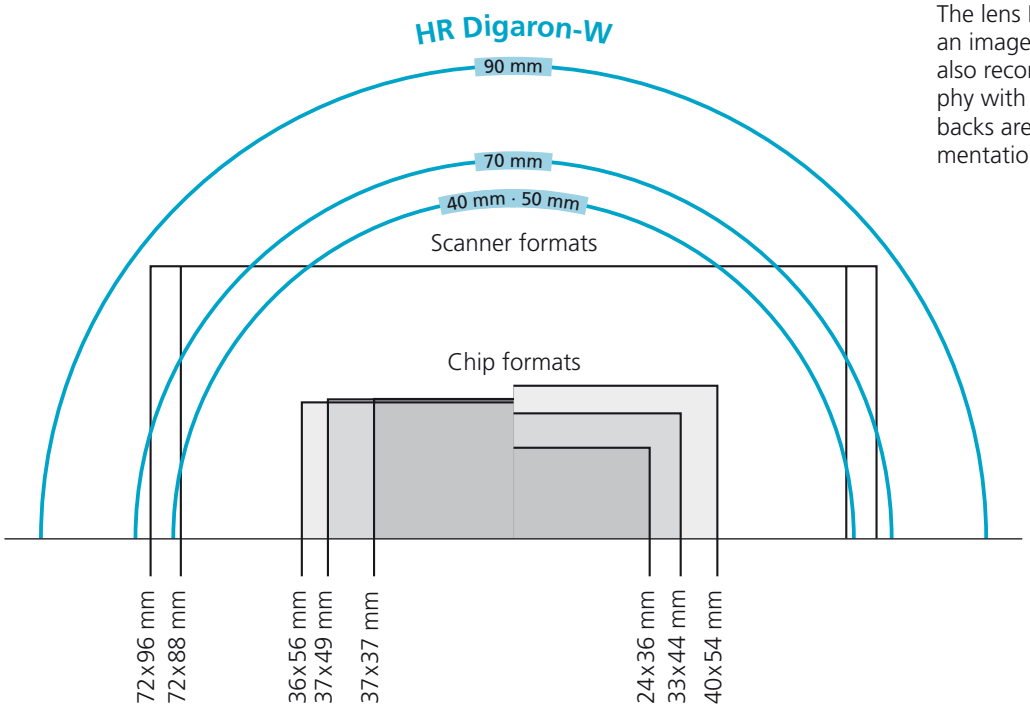
Back to lens description

Working apertures, image angles, image circles and movement ranges

Lens	Ref. image scale	Recomm. working aperture	Image angle	Image circle diameter	Movement range [mm] [2]) vertical/horizontal (landscape format)					
					24×36 mm	37×37 mm	33×44 mm	37×49 mm	36×56 mm	40×54 mm
40 mm f/4	1:∞	5,6-8	94°	90 mm	29 / 25	23 / 23	23 / 20	19 / 17	17 / 13	16 / 13
50 mm f/4	1:∞	5,6-8	84°	90 mm	29 / 25	23 / 23	23 / 20	19 / 17	17 / 13	16 / 13
70 mm f/5,6	1:∞	5,6-8	70°	100 mm	35 / 31	28 / 28	28 / 25	25 / 22	23 / 19	22 / 19
90 mm f/5,6	1:∞	5,6-11	70°	125 mm	48 / 43	41 / 41	42 / 38	39 / 35	38 / 32	36 / 32

[2]) These values apply to the recommended working aperture at the given scale; with increasing scale, image circle and movement ranges increase

Image circles (original size)



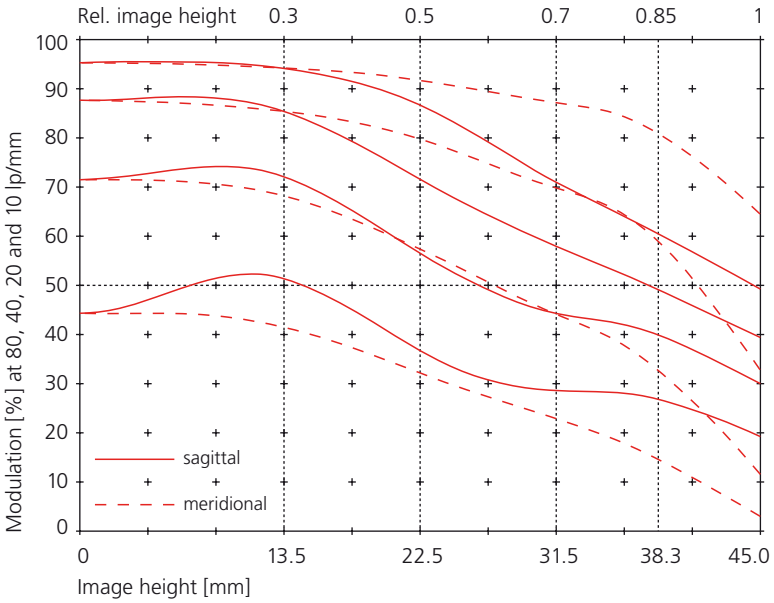
The lens HR Digaron-W 90 mm f/5.6 with an image circle diameter of 125 mm is also recommended for digital photography with scanner backs. Above all, these backs are used for reproduction, documentation and library pictures.

With noticable larger image circles than those of common digital lenses designed for 35 mm format sensors, now a totally new high-tech class of digital lenses is growing up

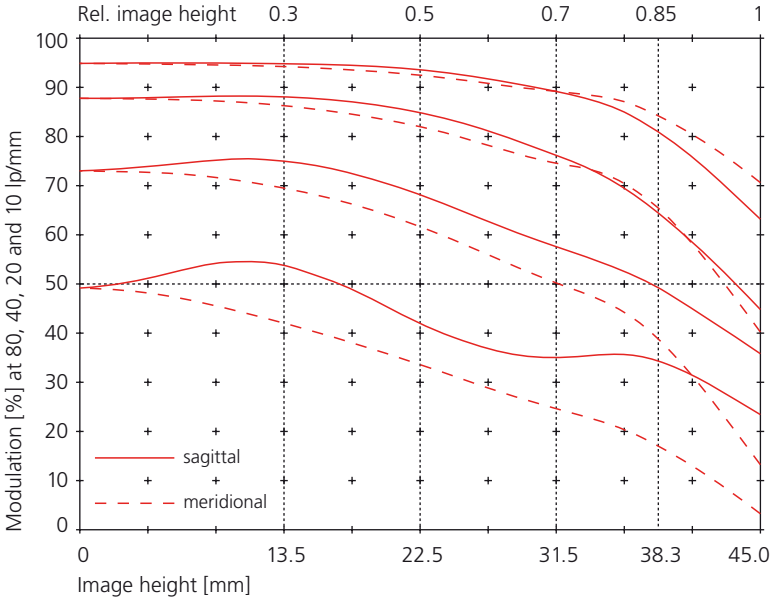
HR Digaron-W 40 mm f/4

Back to lens description

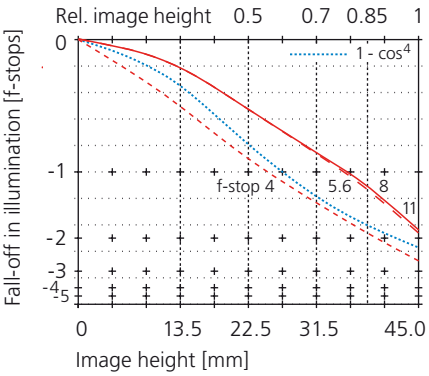
Modulation transfer function **Scale 0x** **f-stop 4**



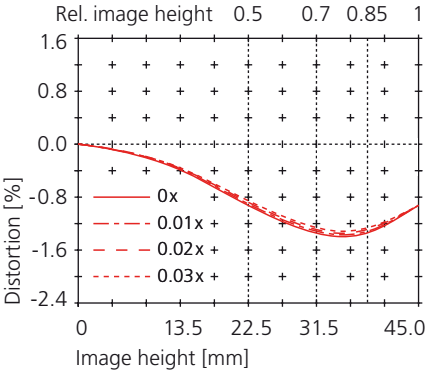
Modulation transfer function **Scale 0x** **f-stop 5.6**



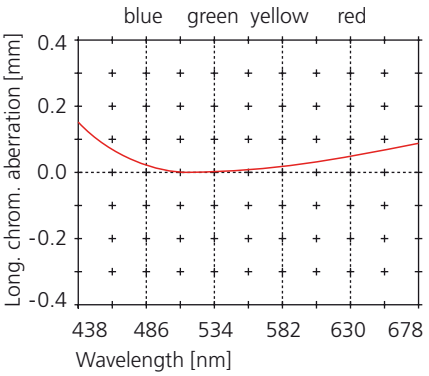
Fall-off in illumination **Scale 0x**



Distortion **Scale 0x ... 0.03x**



Longitud. chrom. aberration Scale 0x

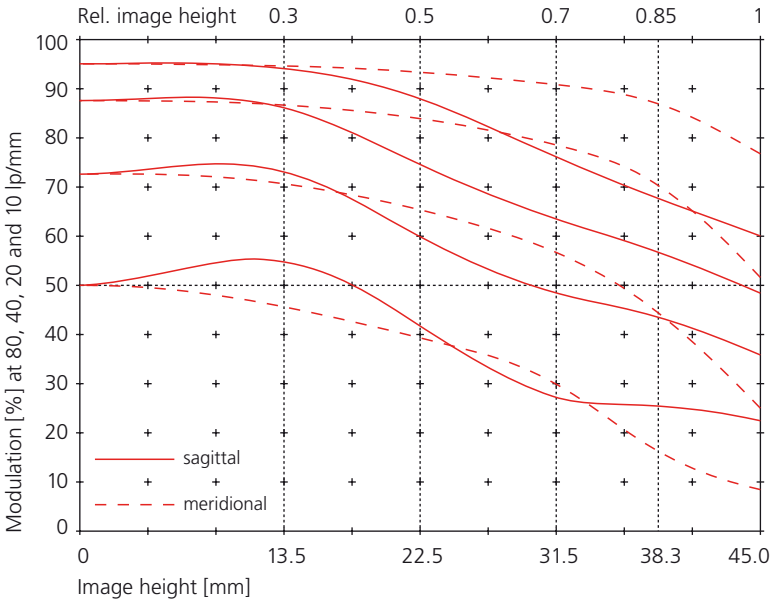


All spatial frequencies [line pairs/mm], image heights [mm] and scales are related to the film or sensor side

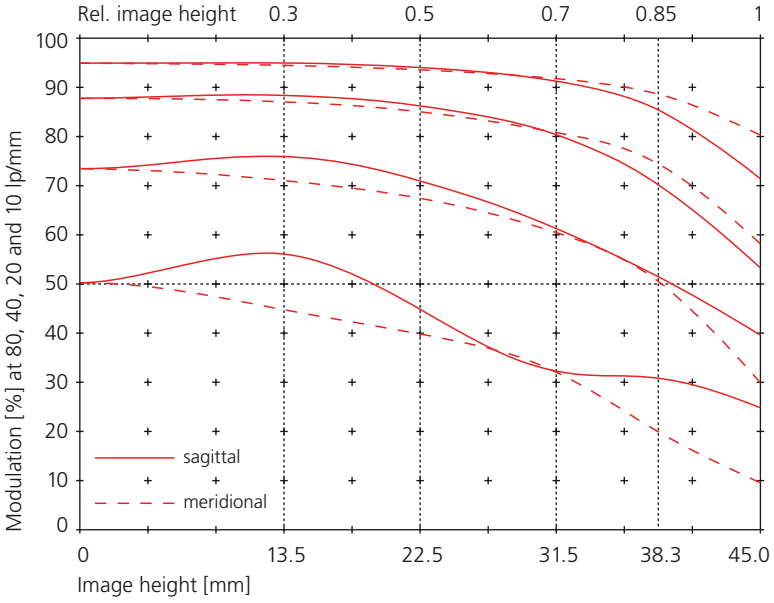
HR Digaron-W 50 mm f/4

Back to lens description

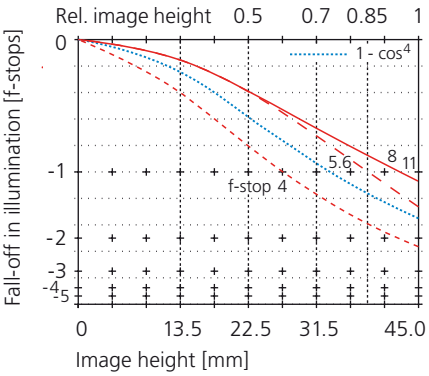
Modulation transfer function **Scale 0x** **f-stop 4**



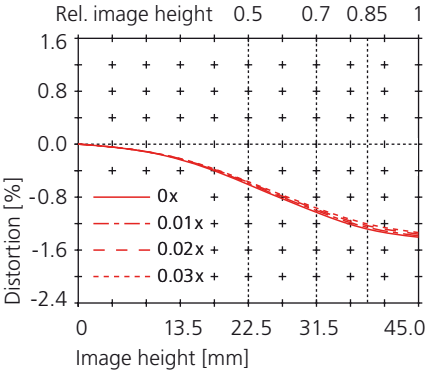
Modulation transfer function **Scale 0x** **f-stop 5.6**



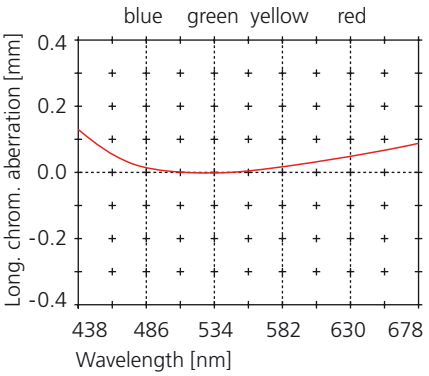
Fall-off in illumination **Scale 0x**



Distortion **Scale 0x ... 0.03x**



Longitud. chrom. aberration Scale 0x

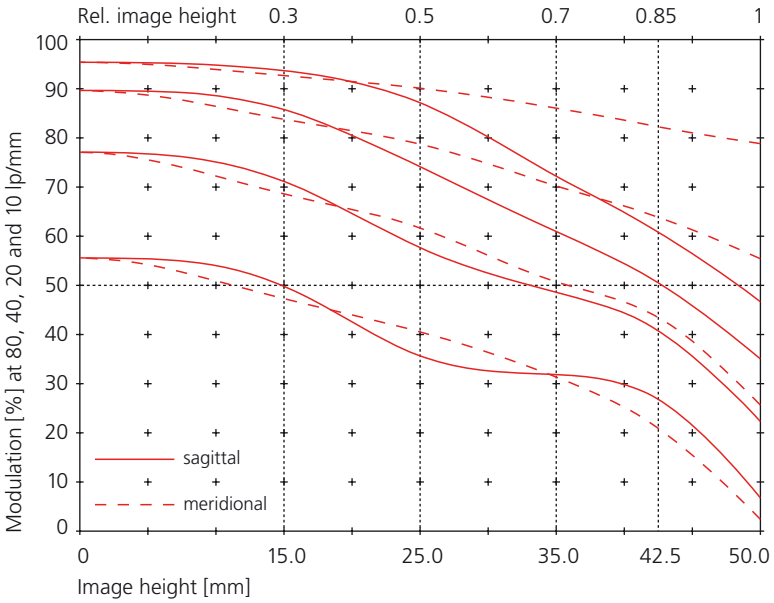


All spatial frequencies [line pairs/mm], image heights [mm] and scales are related to the film or sensor side

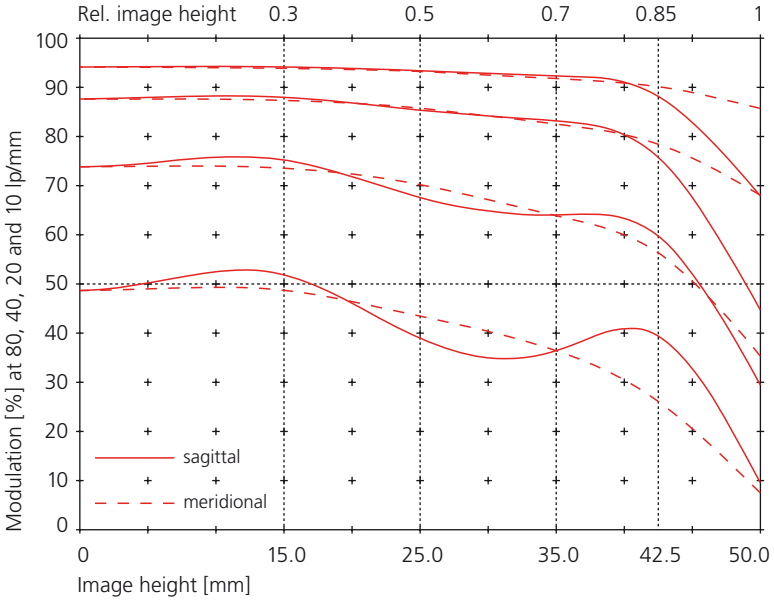
HR Digaron-W 70 mm f/5.6

Back to lens description

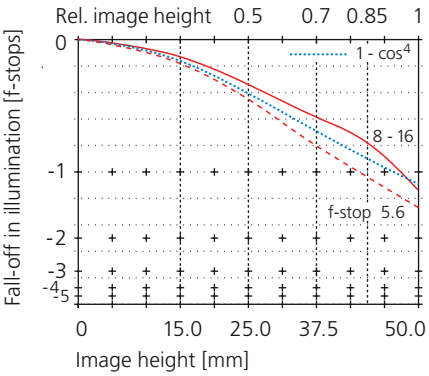
Modulation transfer function **Scale 0.03x** **f-stop 5.6**



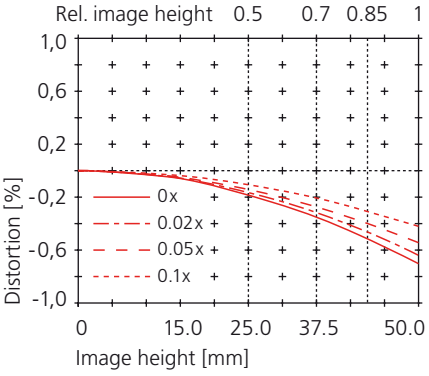
Modulation transfer function **Scale 0.03x** **f-stop 8**



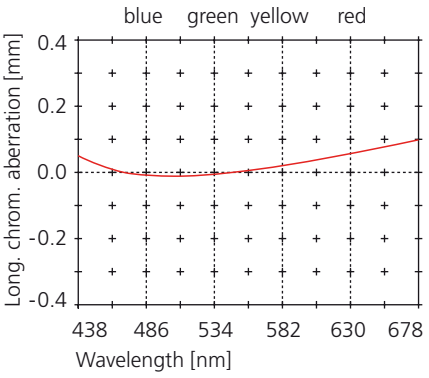
Fall-off in illumination **Scale 0.03x**



Distortion **Scale 0x ... 0.1x**



Long. chrom. aberration **Scale 0.03x**

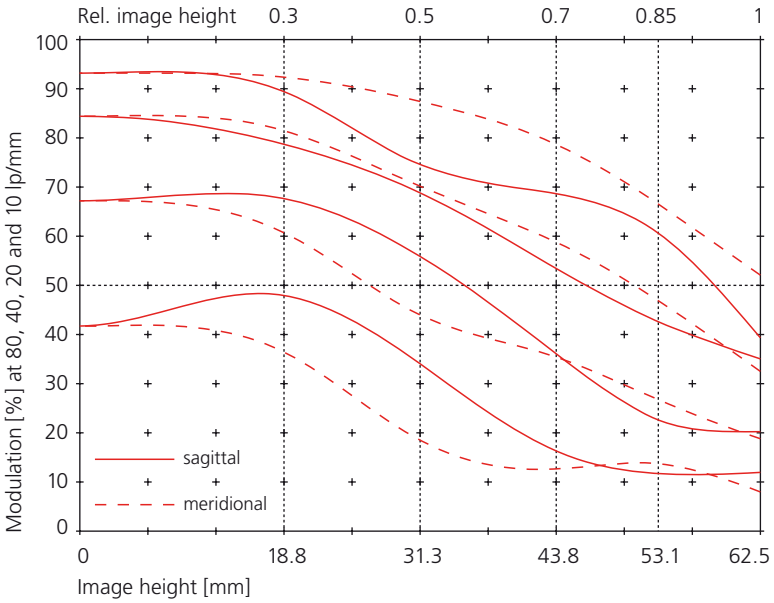


All spatial frequencies [line pairs/mm], image heights [mm] and scales are related to the film or sensor side

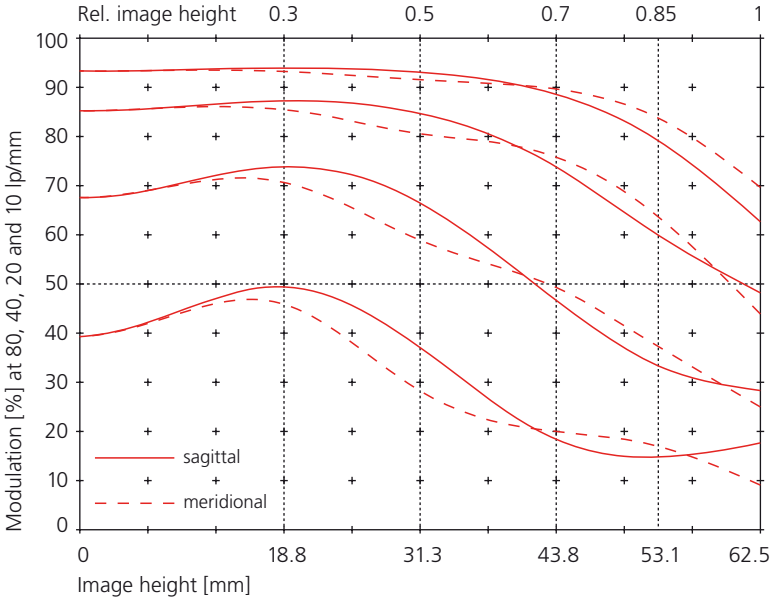
HR Digaron-W 90 mm f/5.6

Back to lens description

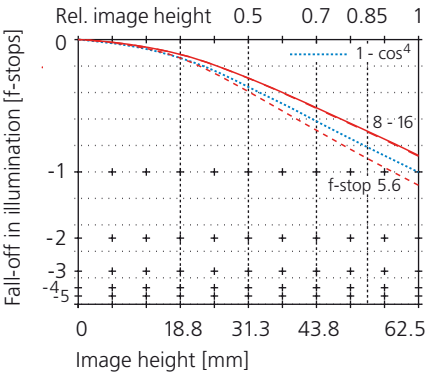
Modulation transfer function **Scale 0.08x** **f-stop 5.6**



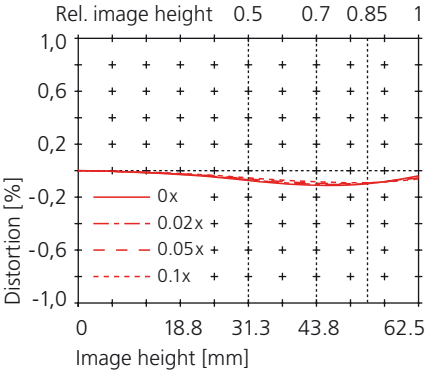
Modulation transfer function **Scale 0.08x** **f-stop 8**



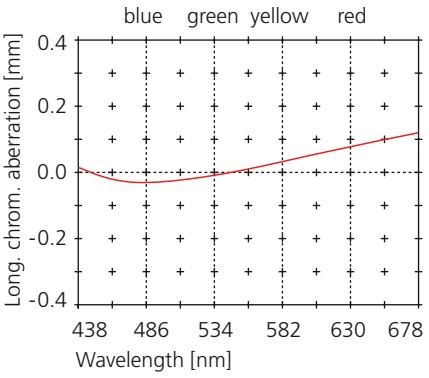
Fall-off in illumination **Scale 0.08x**



Distortion **Scale 0x ... 0.1x**



Long. chrom. aberration **Scale 0.08x**



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

Back to digital photography

HR Digaron-S
HR Digaron-W
Apo-Sironar digital
Apo-Macro-Sironar digital

Accessories: Centerfilter
Accessories: Focus-Mount

Lenses for Digital Professional Photography

Apo-Sironar digital / Apo-Macro-Sironar digital

This line of lenses provides the photographer with even larger image circles for digital photos with adjustable professional cameras. They allow taking two and more laterally shifted overlapping photos for stitching as well as taking large-format photos with scanner backs. Focal lengths from 35 mm mean that real wide-angle shots are possible, even with the standard area sensor sizes, while still allowing large movements. The gap between the focal lengths 55 mm and 105 mm can be closed with the HR Digaron-W 70 mm and 90 mm lenses with image circles of 100 mm and 125 mm diameter respectively.

Due to the small formats on the one hand (which are sensitive to higher diffraction!) and the high illumination requirements of the CCD image sensor on the other, digital photography does not allow the lenses to be stopped down as much as in conventional large-format photography. As a result, these lenses have been optimized for a working aperture of 8 to 11. Because both the surface of the area sensors and the area scanned by the CCD line sensors have greater planarity than conventional roll and sheet films, special attention was given to the correction of the curvature of field. The freedom from distortion, which is so important for product and building photography, and the uniformity of illumination are also excellent.

The Apo-Macro-Sironar digital provides a special macro lens at the same superb performance level of the Rodenstock Apo-Sironar digital series for high-resolution digital photos at reproduction scales from 1:5 to 2:1.

Apo-Sironar digital	**Max. recommended format**
35 mm f/4.5	46×58 mm
45 mm f/4.5	72×96 mm
55 mm f/4.5	72×96 mm
105 mm f/5.6	72×96 mm
135 mm f/5.6	72×96 mm
150 mm f/5.6	72×96 mm
180 mm f/5.6	72×96 mm

Apo-Macro-Sironar digital	
120 mm f/5.6	72×96 mm

Data sheets

Formats, dimensions, shutter data, image circles, movement ranges

Performance data Apo-Sironar digital 35 mm f/4.5

Performance data Apo-Sironar digital 105 mm f/5.6

**Apo-Sironar digital: sharp and brilliant,
with the best flatness of field,
free from color fringes and from distortion**

Apo-Sironar digital / Apo-Macro-Sironar digital

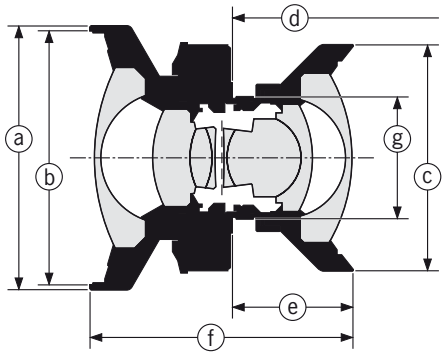
Back to lens description

Formats, shutter sizes, dimensions, weight

Lens	Maximum format	Shutter size	Push-on mount Ø ⓐ	Filter thread ⓑ	Rear barrel Ø ⓒ	Flange foc. length [1] ⓓ	Flange to lens end ⓔ	Overall length ⓕ	Weight w/Copal
35 mm f/4.5	46×56 mm	0	70 mm	M 67×0.75	60.0 mm	43.2 mm	24.7 mm	58.8 mm	220 g
45 mm f/4.5	72×96 mm	0	70 mm	M 67×0.75	60.0 mm	55.5 mm	30.0 mm	70.5 mm	350 g
55 mm f/4.5	72×96 mm	0	70 mm	M 67×0.75	60.0 mm	67.6 mm	32.0 mm	73.8 mm	400 g
105 mm f/5.6	72×96 mm	0	51 mm	M 49×0.75	31.5 mm	100.0 mm	13.8 mm	48.6 mm	170 g
135 mm f/5.6	72×96 mm	0	51 mm	M 49×0.75	48.0 mm	132.0 mm	19.0 mm	53.6 mm	240 g
150 mm f/5.6	72×96 mm	0	51 mm	M 49×0.75	51.0 mm	147.0 mm	22.0 mm	57.4 mm	250 g
180 mm f/5.6	72×96 mm	1	70 mm	M 67×0.75	60.0 mm	177.0 mm	25.5 mm	65.2 mm	410 g
120 mm f/5.6	72×96 mm	0	51 mm	M 49×0.75	40.5 mm	236.0 mm	16.1 mm	49.8 mm	220 g

[1]) With Copal shutter for scale 1:∞,
Apo-Macro-Sironar digital 120 mm f/5.6 for scale 1:1

All lenses of the Apo-Sironar digital and Apo-Macro-Sironar digital series are available not only with the shutters given in the following table, but also with a normal mount (with 39 mm Leica thread) or alternatively (only in combination with Copal 0 shutter) with the "Focus-Mount" helical focuser. For focusing range and flange focal length with Focus-Mount, please see next page.



Continuation performance data

Shutter data

Shutter type and size	Shutter speeds range	Manual cocking	Self cocking	Mechanical	Electronic	X-synchronized	Smallest f-stop increments	Screw thread ⓖ	Lens board opening	Lens board thickness	Accessories required
Copal 0	B, T, 1/500 s … 1 s	•		•		•		M 32.5×0,5	34.8 mm	1.5 … 4,0 mm	
Copal 1	B, T, 1/400 s … 1 s	•		•		•		M 39×0,75	41.8 mm	1.5 … 3,0 mm	
Copal Press 0	B, 1/125 s … 1 s		•	•		•		M 32.5×0,5	34.8 mm	1.5 … 3,0 mm	
Copal Press 1	B, 1/125 s … 1 s		•	•		•		M 39×0,75	41.8 mm	1.5 … 2,0 mm	
Rollei Electron. 0	B, 1/500 s … 30 s				•	•	1/10	M 39×0,75	41.8 mm	1.5 … 3,0 mm	Control Unit
Rollei Electron. 1	B, 1/300 s … 30 s				•	•	1/10	M 39×0,75	41.8 mm	1.5 … 3,0 mm	Control Unit

The ideal high-performance lens for all who need digital photography as well as analog photography on roll film up to 6×9 cm (35 mm f/4.5 without camera movements)

Apo-Sironar digital / Apo-Macro-Sironar digital

Back to lens description

Working apertures, image angles, image circles and movement ranges

Lens	Ref. image scale	Recomm. working aperture	Image angle	Image circle diameter	Movement range [mm] [2]) vertical/horizontal (landscape format)					
					37×49 mm	36×56 mm	40×54 mm	46×58 mm	72×88 mm	72×96 mm
35 mm f/4.5	1:∞	8-11	111°	105 mm	28 / 25	26 / 21	25 / 22	21 / 18		
45 mm f/4.5	1:∞	8-11	107°	125 mm	39 / 35	38 / 32	36 / 32	32 / 29	8 / 7	4 / 3
55 mm f/4.5	1:∞	8-11	95°	125 mm	39 / 35	38 / 32	36 / 32	32 / 29	8 / 7	4 / 3
105 mm f/5.6	1:∞	8-11	62°	125 mm	39 / 35	38 / 32	36 / 32	32 / 29	8 / 7	4 / 3
135 mm f/5.6	1:∞	8-11	58°	150 mm	53 / 48	52 / 45	50 / 45	46 / 42	25 / 22	21 / 18
150 mm f/5.6	1:∞	8-11	53°	150 mm	53 / 48	52 / 45	50 / 45	46 / 42	25 / 22	21 / 18
180 mm f/5.6	1:∞	8-11	45°	150 mm	53 / 48	52 / 45	50 / 45	46 / 42	25 / 22	21 / 18
120 mm f/5.6	1:5 - 2:1	8-11	55° - 24°	150 mm	53 / 48	52 / 45	50 / 45	46 / 42	25 / 22	21 / 18

[2]) These values apply to the recommended working aperture at the given scale; with increasing scale, image circle and movement ranges increase

Focusing range and flage focal length with Focus-Mount

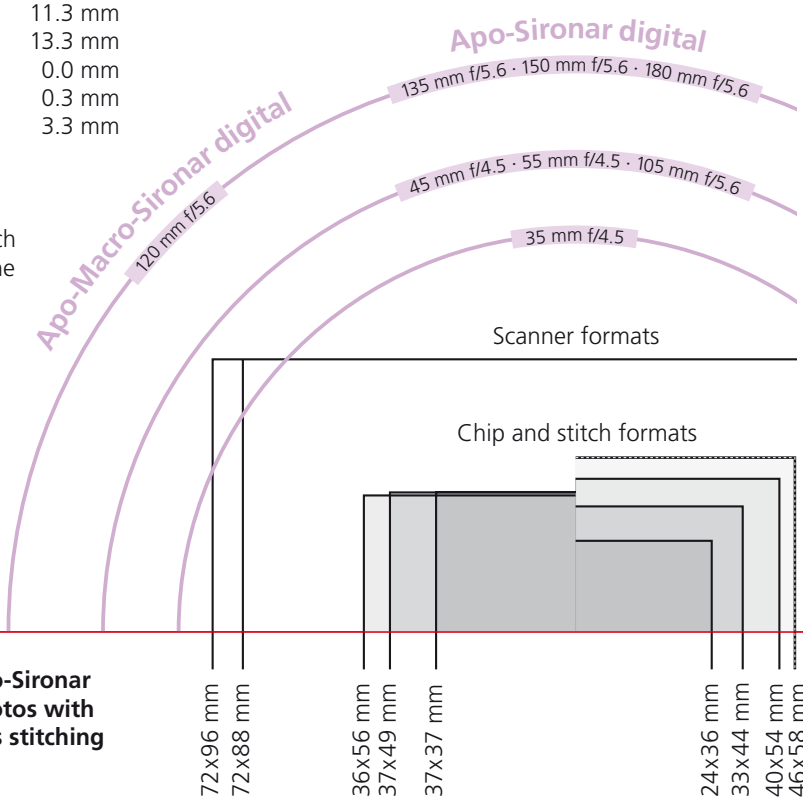
Lens	Focusing range	Flange foc. length [3]) ⓓ	Max. flange to lens end ⓔ
35 mm f/4.5	∞ – 0.4 m / 1.3 ft	24.5 mm	6.0 mm
45 mm f/4.5	∞ – 0.6 m / 2.0 ft	36.8 mm	11.3 mm
55 mm f/4.5	∞ – 0.9 m / 3.0 ft	48.9 mm	13.3 mm
105 mm f/5.6	∞ – 1.8 m / 6.0 ft	81.2 mm	0.0 mm
135 mm f/5.6	∞ – 3.0 m / 10.0 ft	112.7 mm	0.3 mm
150 mm f/5.6	∞ – 3.5 m / 11.5 ft	128.2 mm	3.3 mm

[3]) With Copal shutter for scale 1:∞

Using digital lenses on cameras without bellows such as shift or panoramic cameras requires the use of the focusing facility Focus-Mount. It can be combined with all Rodenstock lenses in Copal shutter size 0. Existing lenses can be installed at a later date.

Bildkreise in Originalgröße ▶

The gab between the focal lengths 55 mm and 105 mm can be closed with the HR Digaron-W 70 mm and 90 mm.

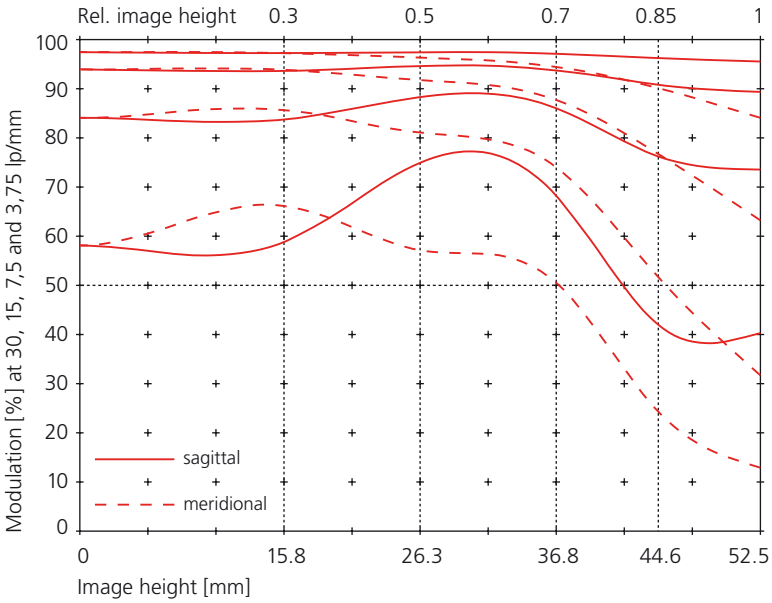


The exceptionally large image circles of the Apo-Sironar digital and Apo-Macro-Sironar digital allow photos with all sensors formats and scanner backs as well as stitching

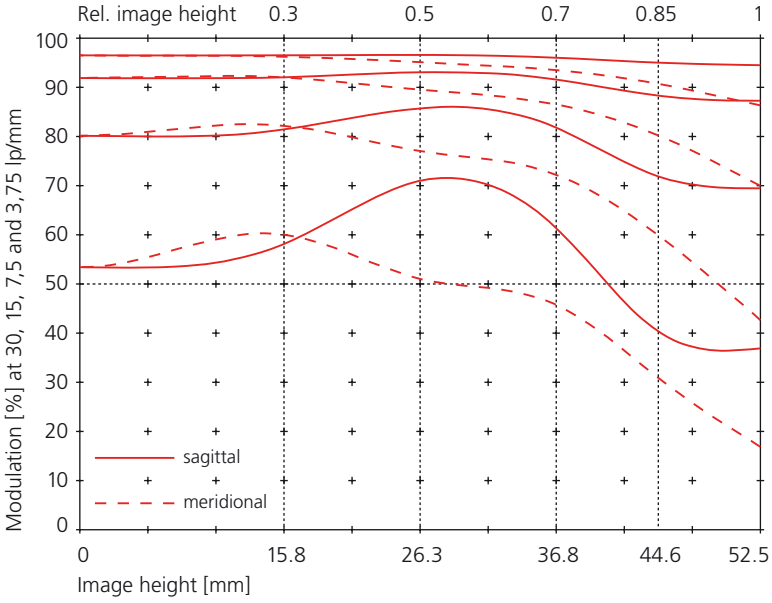
Apo-Sironar digital 35 mm f/4.5

Back to lens description

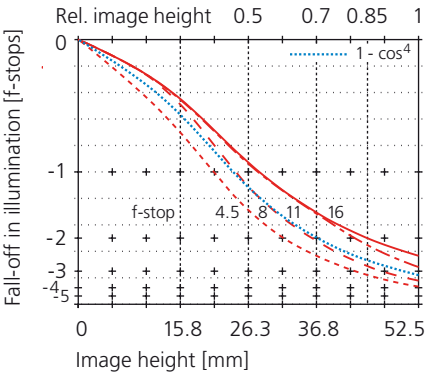
Modulation transfer function **Scale 0.02x** **f-stop 8**



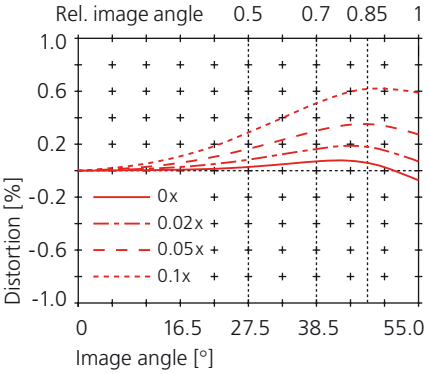
Modulation transfer function **Scale 0.02x** **f-stop 11**



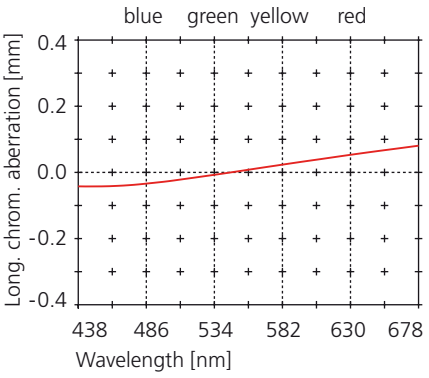
Fall-off in illumination **Scale 0.02x**



Distortion **Scale 0x ... 0.1x**



Long. chrom. aberration **Scale 0.02x**

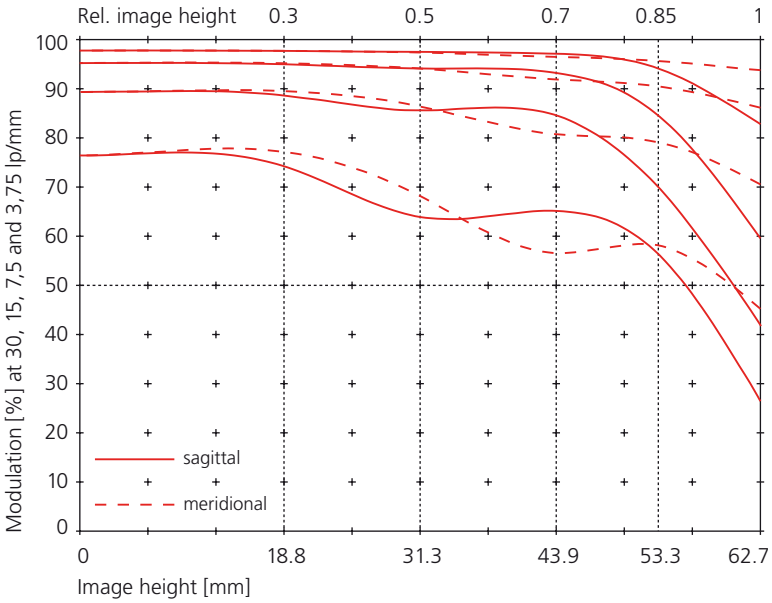


All spatial frequencies [line pairs/mm], image heights [mm] and scales are related to the film or sensor side

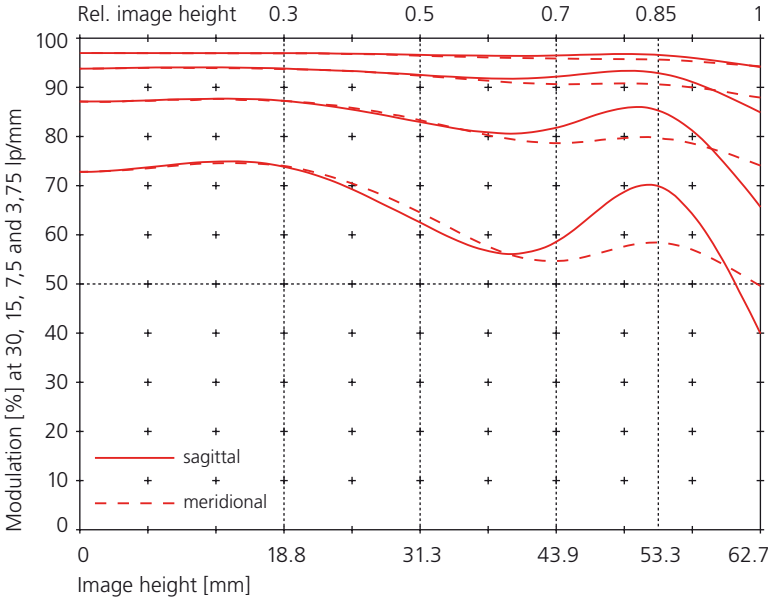
Apo-Sironar digital 105 mm f/5.6

Back to lens description

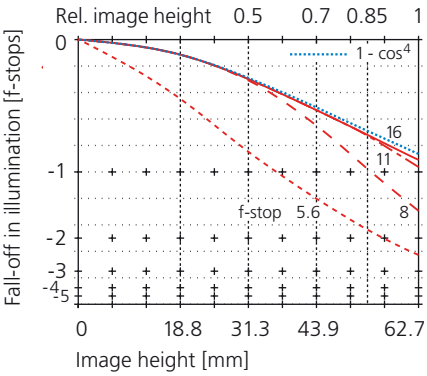
Modulation transfer function **Scale 0.05x** **f-stop 8**



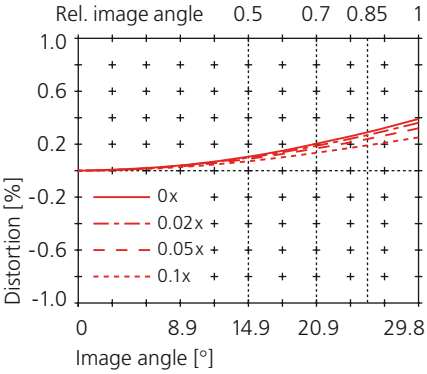
Modulation transfer function **Scale 0.05x** **f-stop 11**



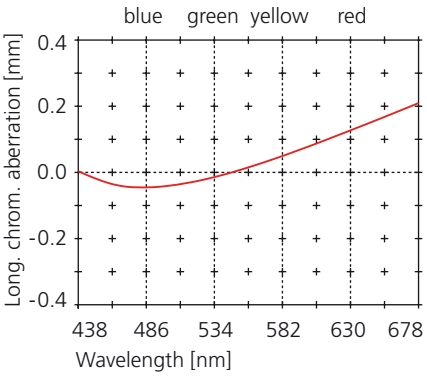
Fall-off in illumination **Scale 0.05x**



Distortion **Scale 0x ... 0.1x**



Long. chrom. aberration **Scale 0.05x**



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

Back to digital photography

HR Digaron-S
HR Digaron-W
Apo-Sironar digital
Apo-Macro-Sironar digital

Accessories: Center filter
Accessories: Focus-Mount

Lenses for Digital Professional Photography

Accessories: Center filter

For critical shots (e.g. with areas of uniform brightness towards the image corners) the physically inevitable light fall-off according to the "cos^4 law" may be visible and irritating. Digital photos can be lightened at the margin with imaging software like Photoshop®, but this does not help if the subjects at the margin are dark, because then they are underexposed and do not show any structure, color and depth. If they were lightened up then they get gray with a lot of image noise. However, the light fall-off can be eliminated by using the neutral gray Rodenstock center filters available for the HR Digaron-S 23 mm and 28 mm. A center filter should always be used if the image circle of is used right up to the vicinity of the circumference.

By utilizing an "optical trick" (tilting and increasing entrance pupil for larger incident angles with the optical axis), the light fall-off of the Rodenstock wide-angle lenses from 35 mm focal length on could be reduced almost to a level of lenses with a standard focal length. That's why no center filter is needed.

Rodenstock center filters are concentric graduated neutral gray filters whose density decreases from the center up to the transparent rim. The fall in density largely compensates for the light fall-off to the image edge from the recommended working f-stop. The remaining light fall-off is similar to that of lenses with longer focal lengths and does not irritate. Because of the density of the center filter the exposure must be corrected either by extended exposure time or by a wider aperture according to the table below.

HR Digaron-S	Filter thread *	Exp. correction f-stop / time
23 mm f/5.6	E 72/86	in preparation
28 mm f/4.5	E 72/86	in preparation

* The first number is the diameter of the rear male thread for fixing at the lens, the second number is the diameter of the front female thread for adding another filter or a lens hood.

Center filter: it compensates for the natural light fall-off of super wide-angle lenses according to the cos^4 law

Back to digital photography

HR Digaron-S
HR Digaron-W
Apo-Sironar digital
Apo-Macro-Sironar digital

Zubehör: Centerfilter
Zubehör: Focus-Mount

Lenses for Digital Professional Photography

Accessories: Focus-Mount

Using Rodenstock digital lenses on cameras without bellows such as panoramic or shift cameras requires the use of a focusing facility: The Focus-Mount can be combined with all Rodenstock lenses in shutter size 0.

Existing lenses can be installed at a later date.

The Focus-Mount ensures precise focusing and the non-rotating lens mount means that all operating elements and scales of the shutter remain in the same position for best reading and handling. The Rodenstock digital lenses which can be used in the Focus-Mount as well as their focusing ranges can be found in the following table. For all lenses listed in this table the Focus-Mount is available with a distance scale (in meters and feet) adjusted to the respective focal length.

More information on applications and adaption of the Focus-Mount are available on request.

Digital lens		Focusing range
HR Digaron-S	23 mm f/5.6	∞ – 0.25 m
	28 mm f/4.5	∞ – 0.3 m
	35 mm f/4	∞ – 0.4 m
	60 mm f/4	∞ – 0.7 m
	100 mm f/4	∞ – 1.8 m
	180 mm f/5.6	∞ – 4.0 m
HR Digaron-W	40 mm f/4	∞ – 0.5 m
	70 mm f/5.6	∞ – 0.8 m
	90 mm f/5.6	∞ – 1.3 m
Apo-Sironar digital	35 mm f/4.5	∞ – 0.4 m
	45 mm f/4.5	∞ – 0.6 m
	55 mm f/4.5	∞ – 0.9 m
	105 mm f/5.6	∞ – 1.8 m
	135 mm f/5.6	∞ – 3.0 m
	150 mm f/5.6	∞ – 3.5 m

Focus-Mount: it makes it possible to use the Rodenstock digital lenses on shift and panoramic cameras

Back to general overview

Apo-Sironar-S
Apo-Macro-Sironar
Apo-Grandagon
Grandagon-N

Accessories: Center filters
Accessories: Focus-Mount

Lenses for Analog Professional Photography

Even in the age of digital photography, the professional large format camera remains an important tool for advertising, still-life and architectural photographs. The large formats of conventional photography still offer competitive sharpness and an incomparable abundance of detail. Professional cameras allow perspective corrections and deliberate inclinations of the plane of best sharpness ("Scheimpflug plane") which is not possible with nonadjustable cameras or – when using shift or perspective control lenses available in very limited focal lengths – only with great restrictions.

Rodenstock's range of lenses for professional photography therefore includes different lens types which are available in graduated focal lengths to meet practical requirements.

- The standard lens for conventional professional photography should provide a medium to large image angle, high speed and best image quality. These demands are perfecly met by the Rodenstock Apo-Sironar-S. As a standard lens, it is used with a focal length which roughly corresponds to the diagonal of the film format. With longer focal lengths larger taking distances are possible.

- For large image scales from around 1:5 to 2:1, there is the special close-up lens Apo-Macro-Sironar. It is characterized by excellent definition in this scale range as well as by high speed and a wide image circle.

- Whenever small rooms, wide spaces or short taking distances (architecture) make large field angles necessary, the wide-angle lenses of first choice are the Apo-Grandagon and the Grandagon-N with field angles of up to 120°.

- When the large movement range of the ultra-wide angle lenses Apo-Grandagon and Grandagon-N is utilized, the physically unavoidable fall-off in illumination to the margin of the image circle can generally be reduced by a Rodenstock center filter which is available in the same high quality as our lenses and with vignetting-free mounts.

- In order to be able to use our high-performance lenses with cameras without bellows like panoramic or shift cameras, we developed our non-rotating focusing device "Focus-Mount". It is available with distance scales precisely matched to any focal length of all Rodenstock lenses in shutter size 0.

The prefix "Apo" stands for the best possible correction of chromatic aberration and guarantees crisp and brilliant photos without color fringes

Back to analog photography

Apo-Sironar-S
Apo-Macro-Sironar
Apo-Grandagon
Grandagon-N

Accessories: Center filters
Accessories: Focus-Mount

Lenses for Analog Professional Photography

Apo-Sironar-S

The Apo-Sironar-S is a lens for universal use which has been modified to provide the highest image reproduction quality. Like the Apo-Sironar-N, its applications are almost unlimited. Its special strengths can be seen when complex, fine structures in the outer part of the image circle have to be reproduced.

Its field angle has been increased to 75° and so permits even more generous shifts. Therefore, the Apo-Sironar-S is also the ideal standard lens for applications which require particularly large parallel shifts to correct the perspective. For instance, the Apo-Sironar-S 150 mm f/5.6 permits up to 10 mm more lateral or vertical shift than the equivalent Apo-Sironar-N lens.

As a result of the elimination of the secondary spectrum thanks to the use of ED glass materials with anomalous dispersion (ED = extra low dispersion), no visible color fringing occurs even at edges with extreme contrast. In addition, the light fall-off towards the image corners (vignetting) has been reduced for a more uniform illumination.

Thanks to this high optical performance in the edges of the field, the six-element Apo-Sironar-S can be used with a wider aperture than other large format lenses in order to avoid blur due to diffraction, e.g. with f-stop 16 as its working aperture instead of f-stop 22. This is an additional advantage for outdoor shots due to the shorter exposure time this allows.

Apo-Sironar-S	Max. recommended film format
100 mm f/5.6	6×9 cm
135 mm f/5.6	9×12 cm / 4×5 in.
150 mm f/5.6	9×12 cm / 4×5 in.
180 mm f/5.6	13×18 cm / 5×7 in.
210 mm f/5.6	13×18 cm / 5×7 in.
240 mm f/5.6	13×18 cm / 5×7 in.
300 mm f/5.6	18×24 cm / 8×10 in.
360 mm f/6.8	18×24 cm / 8×10 in.

Data sheets

Formats, dimensions, shutter data, image circles, movement ranges

Performance data Apo-Sironar-S 150 mm f/5.6

Apo-Sironar-S: the ultimate large format lens with extensive adjustment reserves

Apo-Sironar-S

Back to lens description

Formats, shutter sizes, dimensions, weight

Lens	Max. recommended film format	Shutter size	Push-on mount Ø	Filter thread	Rear barrel Ø	Flange focal length [1]	Overall length	Weight w/Copal
100 mm f/5.6	6×9 cm	0	51 mm	M 49×0.75	31.5 mm	99.0 mm	42.6 mm	190 g
135 mm f/5.6	9×12 cm / 4×5 in.	0	51 mm	M 49×0.75	48.0 mm	132.0 mm	47.5 mm	240 g
150 mm f/5.6	9×12 cm / 4×5 in.	0	51 mm	M 49×0.75	51.0 mm	147.0 mm	51.5 mm	250 g
180 mm f/5.6	13×18 cm / 5×7 in.	1	70 mm	M 67×0.75	60.0 mm	177.0 mm	60.5 mm	410 g
210 mm f/5.6	13×18 cm / 5×7 in.	1	75 mm	M 72×0.75	65.0 mm	202.0 mm	69.5 mm	490 g
240 mm f/5.6	13×18 cm / 5×7 in.	3	90 mm	M 86×1	80.0 mm	230.0 mm	82.0 mm	980 g
300 mm f/5.6	18×24 cm / 8×10 in.	3	105 mm	M 100×1	80.0 mm	277.0 mm	98.5 mm	1210 g
360 mm f/6.8	18×24 cm / 8×10 in.	3	117 mm	M 112×1.5	80.0 mm	330.0 mm	120.0 mm	1560 g

[1] With Copal shutter for scale 1:∞

Shutter data

Shutter type and size	Shutter speeds range	Manual cocking	Self cocking	Mechanical	Electronic	x-synchronized	Smallest f-stop increments	Screw thread	Lens board opening	Lens board thickness	Accessories required
Copal 0	B, T, 1/500 s … 1 s	•		•		•		M 32.5×0.5	34.8 mm	1.5 … 4.0 mm	
Copal 1	B, T, 1/400 s … 1 s	•		•		•		M 39×0.75	41.8 mm	1.5 … 3.0 mm	
Copal 3	B, 1/125 s … 1 s	•		•		•		M 62×0.75	65.3 mm	1.5 … 5.0 mm	
Copal Press 0	B, 1/125 s … 1 s		•	•		•		M 32.5×0.5	34.8 mm	1.5 … 3.0 mm	
Copal Press 1	B, 1/125 s … 1 s		•	•		•		M 39×0.75	41.8 mm	1.5 … 2.0 mm	
Rollei Electron. 0	B, 1/500 s … 30 s				•	•	1/10	M 39×0.75	41.8 mm	1.5 … 3.0 mm	Control Unit
Rollei Electron. 1	B, 1/300 s … 30 s				•	•	1/10	M 39×0.75	41.8 mm	1.5 … 3.0 mm	Control Unit

Working apertures, image angles, image circles and movement ranges

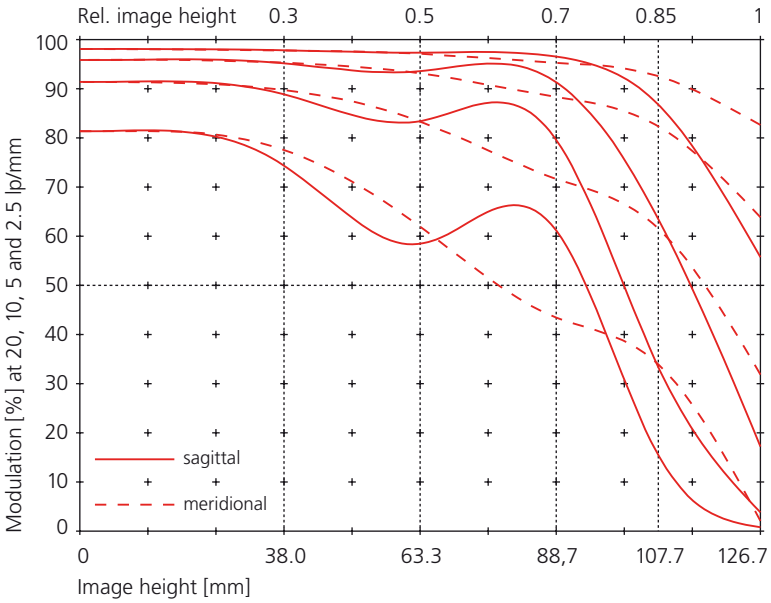
Lens	Image scale	Working f-stop	Image angle	Image circle diameter	Movement range [mm] [2] vertical/horizontal (landscape format) 6×7 cm	6×9 cm	6×12 cm	4×5 in.	5×7 in.	8×10 in.
100 mm f/5.6	1:∞	11-22	75°	155 mm	41 / 38	36 / 28	24 / 13	1 / 1		
135 mm f/5.6	1:∞	11-22	75°	208 mm	77 / 66	66 / 56	59 / 43	37 / 32		
150 mm f/5.6	1:∞	11-22	75°	231 mm	82 / 78	79 / 68	72 / 55	51 / 45	17 / 13	
180 mm f/5.6	1:∞	16-32	75°	276 mm	105 / 101	103 / 91	98 / 78	76 / 69	48 / 39	
210 mm f/5.6	1:∞	16-32	75°	316 mm	126 / 121	124 / 112	119 / 98	98 / 90	73 / 61	3 / 2
240 mm f/5.6	1:∞	16-32	75°	372 mm	155 / 150	153 / 140	149 / 127	128 / 120	105 / 91	43 / 36
300 mm f/5.6	1:∞	22-45	75°	448 mm	193 / 188	192 / 179	189 / 165	168 / 159	147 / 131	90 / 79
360 mm f/6.8	1:∞	22-45	68°	468 mm	203 / 198	202 / 188	199 / 175	178 / 169	157 / 141	102 / 90

[2] These values apply to the recommended working aperture at the given scale; with increasing scale, image circle and movement ranges increase

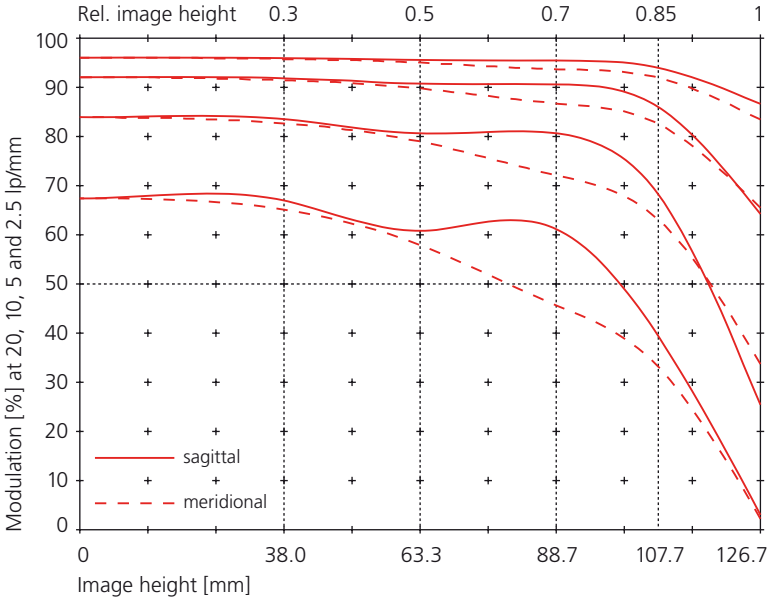
Apo-Sironar-S 150 mm f/5.6

Back to lens description

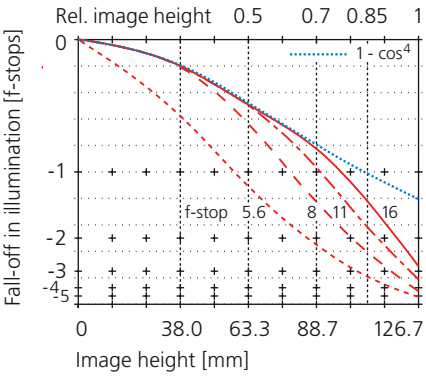
Modulation transfer function **Scale 0.1x** **f-stop 11**



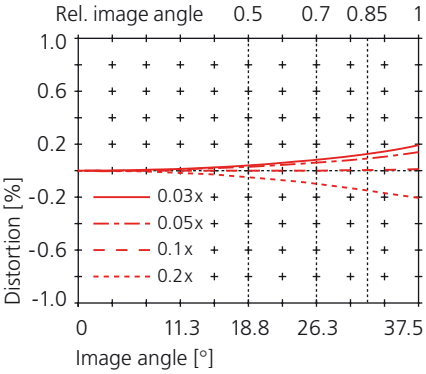
Modulation transfer function **Scale 0.1x** **f-stop 22**



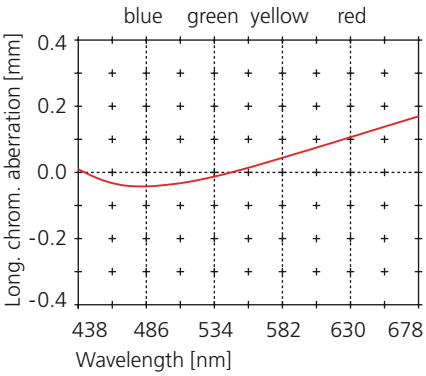
Fall-off in illumination **Scale 0.1x**



Distortion **Scale 0.03x ... 0.2x**



Long. chrom. aberration **Scale 0.1x**



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

Back to analog photography

Apo-Sironar-S
Apo-Macro-Sironar
Apo-Grandagon
Grandagon-N

Accessories: Center filters
Accessories: Focus-Mount

Lenses for Analog Professional Photography

Apo-Macro-Sironar

In the near area, at scales of around 1:1, the quality of lenses optimized for larger distances falls visibly from the usual standard of performance. Here the Apo-Macro-Sironar lens comes into its own for imaging scales of 1:5 and greater.

Incidentally, imaging scales of 1:5 or larger are required even in conventional table-top photography or studio photography (e.g. pack shots): for example, a scale of 1:3 at a film size of 4×5 in. means the full format image reproduction of an object of approximately 30×40 cm in size.

The Apo-Macro-Sironar offers excellent imaging quality in conjunction with the wide freedom of movement required for perfect perspective corrections of large-format photography. The movement may be even larger for larger image scales.

The Apo-Macro-Sironar provides exceptional results without any color fringes at a scale range from 1:5 to 2:1 without any need to adjust the lens individually or to reverse the front and rear lens group. The focal lengths of 120 mm and 180 mm allow work with most cameras without any extra monorail extension even at a scale of 2:1.

Apo-Macro-Sironar	Max. recommended film format
120 mm f/5.6	9×12 cm / 4×5 in.
180 mm f/5.6	13×18 cm / 5×7 in.

Data sheets

Formats, dimensions, shutter data, image circles, movement ranges

Performance data Apo-Macro-Sironar 120 mm f/5.6

Apo-Macro-Sironar: the best large format lens to make little things look great

Apo-Macro-Sironar

Back to lens description

Formats, shutter sizes, dimensions, weight

Lens	Max. recommended film format	Shutter size	Push-on mount Ø	Filter thread	Rear barrel Ø	Flange focal length [1]	Overall length	Weight w/Copal
120 mm f/5.6	9×12 cm / 4×5 in.	0	51 mm	M 49×0.75	40.5 mm	235.6 mm	43.8 mm	220 g
180 mm f/5.6	13×18 cm / 5×7 in.	1	70 mm	M 67×0.75	54.0 mm	356.6 mm	61.2 mm	410 g

[1]) With Copal shutter for scale 1:∞

Shutter data

Shutter type and size	Shutter speeds range	Manual cocking	Self cocking	Mechanical	Electronic	x-synchronized	Smallest f-stop increments	Screw thread	Lens board opening	Lens board thickness	Accessories required
Copal 0	B, T, 1/500 s … 1 s	•		•		•		M 32.5×0.5	34.8 mm	1.5 … 4.0 mm	
Copal 1	B, T, 1/400 s … 1 s	•		•		•		M 39×0.75	41.8 mm	1.5 … 3.0 mm	
Copal Press 0	B, 1/125 s … 1 s		•	•		•		M 32.5×0.5	34.8 mm	1.5 … 3.0 mm	
Copal Press 1	B, 1/125 s … 1 s		•	•		•		M 39×0.75	41.8 mm	1.5 … 2.0 mm	
Rollei Electron. 0	B, 1/500 s … 30 s				•	•	1/10	M 39×0.75	41.8 mm	1.5 … 3.0 mm	Control Unit
Rollei Electron. 1	B, 1/300 s … 30 s				•	•	1/10	M 39×0.75	41.8 mm	1.5 … 3.0 mm	Control Unit

Working apertures, image angles, image circles and movement ranges

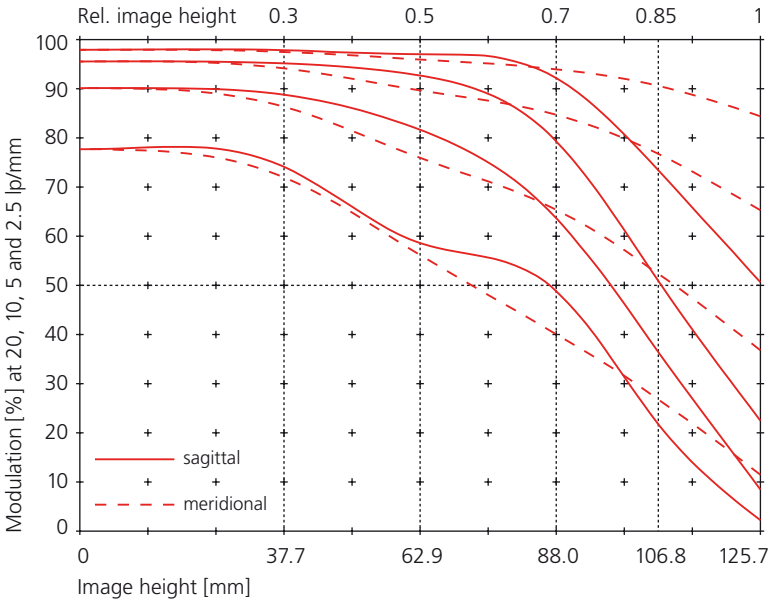
Lens	Image scale	Working f-stop	Image angle	Image circle diameter	Movement range [mm] [2]) vertical/horizontal (landscape format) 6×7 cm	6×9 cm	6×12 cm	4×5 in.	5×7 in.	8×10 in.
120 mm f/5.6	1:5	8-11	70°	201 mm	66 / 62	62 / 52	55 / 39	33 / 28		
	1:1	8-11	60°	277 mm	106 / 101	103 / 92	98 / 79	77 / 70	49 / 39	
	2:1	8-11	55°	374 mm	156 / 151	154 / 141	150 / 128	129 / 121	106 / 92	44 / 37
180 mm f/5.6	1:5	16-22	70°	302 mm	119 / 114	116 / 104	112 / 91	90 / 83	64 / 53	
	1:1	16-22	60°	415 mm	177 / 171	174 / 161	171 / 148	150 / 142	129 / 113	70 / 61
	2:1	16-22	55°	562 mm	251 / 245	249 / 235	247 / 222	226 / 217	207 / 189	156 / 141

[2]) These values apply to the recommended working aperture at the given scale; with increasing scale, image circle and movement ranges increase

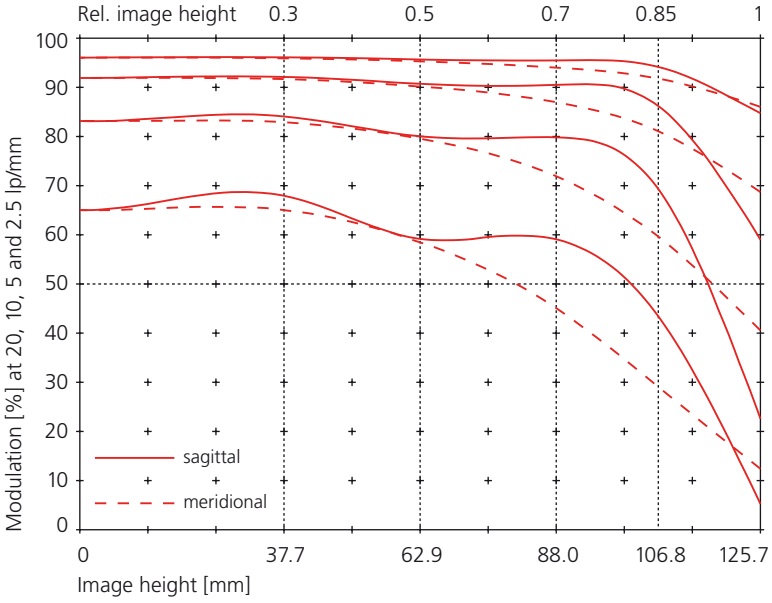
Apo-Macro-Sironar 120 mm f/5.6

Back to lens description

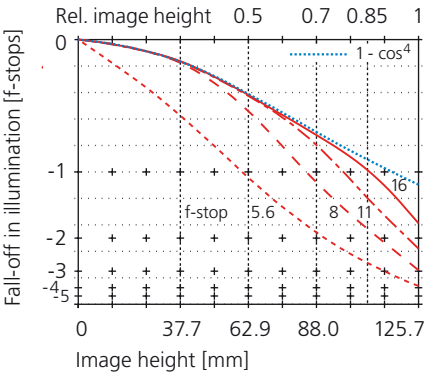
Modulation transfer function Scale 0.5x f-stop 8



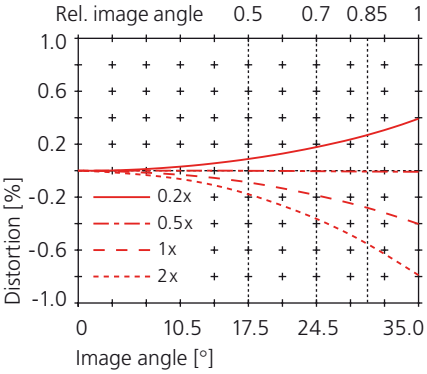
Modulation transfer function Scale 0.5x f-stop 16



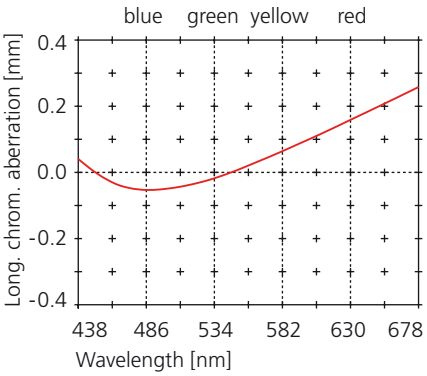
Fall-off in illumination Scale 0.5x



Distortion Scale 0.2x ... 2x



Long. chrom. aberration Scale 0.5x



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

Back to analog photography

Apo-Sironar-S
Apo-Macro-Sironar
Apo-Grandagon
Grandagon-N

Accessories: Center filters
Accessories: Focus-Mount

Lenses for Analog Professional Photography

Apo-Grandagon

When large format cameras are used with roll film backs, they require shorter focal length lenses. With the focal lengths of 35, 45 and 55 mm of the Apo-Grandaon lenses, photography in close spaces or panoramic views in landscape photography becomes an effortless "dynamic enjoyment".

The Apo-Grandagon ultra-wide angle lenses give you the freedom to find new and appealing views in product photography. But new standards in freedom of movement are also offered by these outstanding lenses with a useful field angle of 120° in architectural and industrial photography. The Apo-Grandagon 55 mm f/4.5 even allows photographs of, for example, wide open spaces on 4×5 in. sheet film which is most popular in demanding landscape photography.

New glass combinations (ED glasses) make possible apochromatic correction of ultra-wide angle lenses for the first time. This ensures there will be no color fringes even on high contrast building silhouettes against bright sky. With values of less than 0.5 %, distortion can be neglected.

The high maximum aperture makes adjustment easy. A large working aperture of 8-11 allows advantageous, shorter exposure times for outdoor motifs (with moving objects) or a lower flash power in the studio. For uniformly illuminated pictures without light fall-off according to the "$\cos^4$ law", the use of the color-neutral Rodenstock center filters is recommended.

With the Rodenstock Focus-Mount, these lenses can be fitted to panoramic or shift cameras without bellows.

For checking the adaptation to different large format camera models, we can provide you with special tables and instructions on request.

Apo-Grandagon	Max. recommended film format
35 mm f/4.5	6×9 cm
45 mm f/4.5	6×12 cm
55 mm f/4.5	9×12 cm / 4×5 in.

Data sheets

Formats, dimensions, shutter data, image circles, movement ranges

Performance data Apo-Grandagon 45 mm f/4.5

Apo-Grandagon: freedom for architecture, landscape and studio

Apo-Grandagon

Back to lens description

Formats, shutter sizes, dimensions, weight

Lens	Max. recommended film format	Shutter size	Push-on mount Ø	Filter thread	Rear barrel Ø	Flange focal length [1]	Overall length	Weight w/Copal
35 mm f/4.5	6×9 cm	0	70 mm	M 67×0.75	60.0 mm	43.2 mm	55.7 mm	300 g
45 mm f/4.5	6×12 cm	0	70 mm	M 67×0.75	60.0 mm	55.5 mm	65.3 mm	350 g
55 mm f/4.5	9×12 cm / 4×5 in.	0	70 mm	M 67×0.75	60.0 mm	67.6 mm	69.8 mm	400 g

[1]) With Copal shutter for scale 1:∞

Shutter data

Shutter type and size	Shutter speeds range	Manual cocking	Self cocking	Mechanical	Electronic	x-synchronized	Smallest f-stop increments	Screw thread	Lens board opening	Lens board thickness	Accessories required
Copal 0	B, T, 1/500 s … 1 s	•		•		•		M 32.5×0.5	34.8 mm	1.5 … 4.0 mm	
Copal Press 0	B, 1/125 s … 1 s		•	•		•		M 32.5×0.5	34.8 mm	1.5 … 3.0 mm	
Rollei Electron. 0	B, 1/500 s … 30 s				•	•	1/10	M 39×0.75	41.8 mm	1.5 … 3.0 mm	Control Unit

Working apertures, image angles, image circles and movement ranges

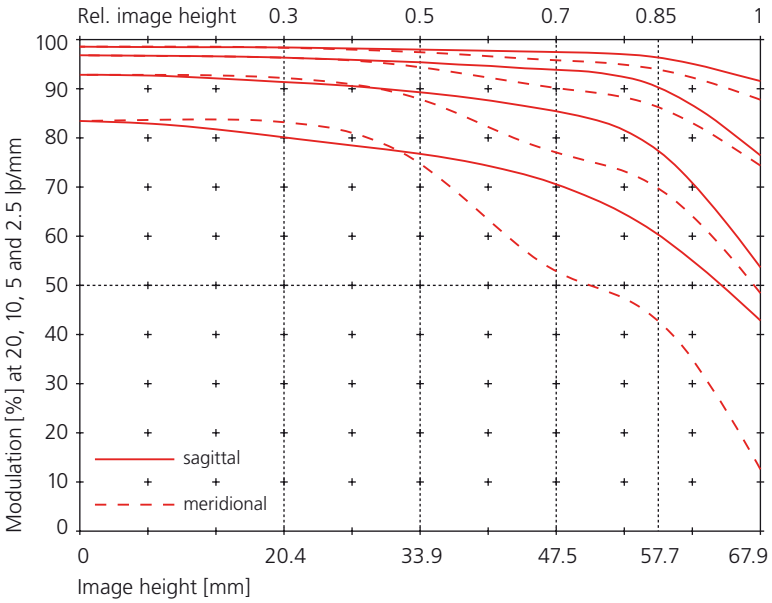
Lens	Image scale	Working f-stop	Image angle	Image circle diameter	Movement range [mm] [2]) vertical/horizontal (landscape format) 6×7 cm	6×9 cm	6×12 cm	4×5 in.	5×7 in.	8×10 in.
35 mm f/4.5	1:∞	8-11	120°	125 mm	24 / 22	16 / 12				
45 mm f/4.5	1:∞	8-11	110°	131 mm	28 / 25	20 / 15	4 / 2			
55 mm f/4.5	1:∞	8-11	110°	163 mm	46 / 42	40 / 32	30 / 19	7 / 6		

[2]) These values apply to the recommended working aperture at the given scale; with increasing scale, image circle and movement ranges increase

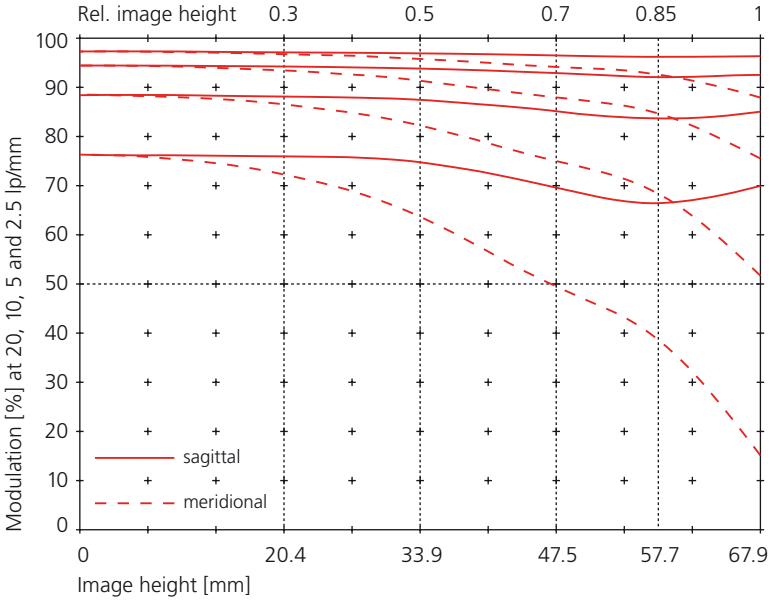
Apo-Grandagon 45 mm f/4.5

Back to lens description

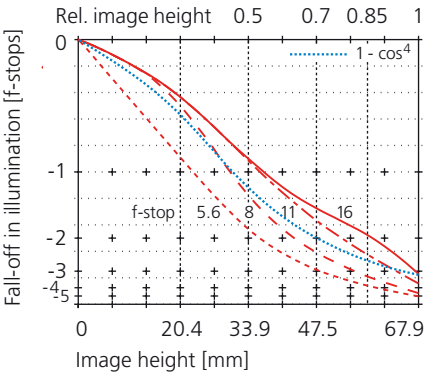
Modulation transfer function **Scale 0.03x** **f-stop 8**



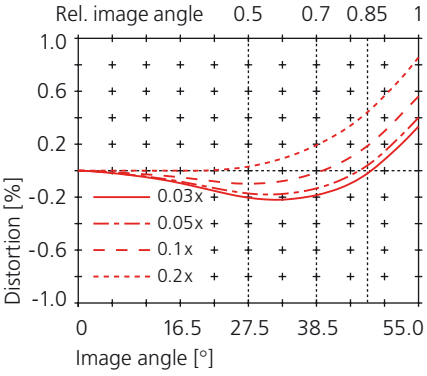
Modulation transfer function **Scale 0.03x** **f-stop 16**



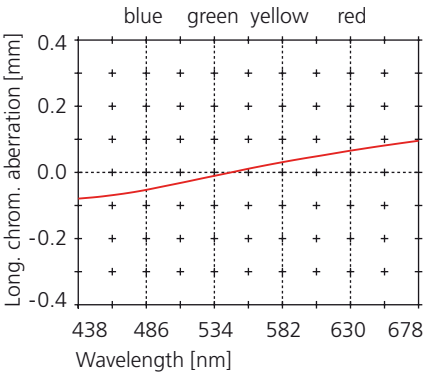
Fall-off in illumination **Scale 0.03x**



Distortion **Scale 0.03x ... 0.2x**



Long. chrom. aberration **Scale 0.03x**



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

Back to analog photography

Apo-Sironar-S
Apo-Macro-Sironar
Apo-Grandagon
Grandagon-N

Accessories: Center filters
Accessories: Focus-Mount

Lenses for Analog Professional Photography

Grandagon-N

The Grandagon-N with its wide field angle of up to 105° can really display its strengths in wide photos in close conditions, e.g. in architecture or industrial photos or in panoramic views.

With the Grandagon-N, all the problems which occur in connection with large field angles have been ideally taken care of: The distortion has been reduced to a small residual value; the light fall-off at the edge has been greatly reduced thanks to an optical trick ("pupil distortion" = the entrance pupil diameter increases when viewing at an angle); the sharpness sets standards for this class of lens.

The Grandagon-N is available in two versions: With the maximum aperture 4.5 in focal lengths 65 to 90 mm it has 8 elements in 4 groups, and with the maximum aperture 6.8 in the focal length 90 mm it has 6 elements in 4 groups.

The eight element lenses offer not only a high maximum aperture, but also a field angle of 105°, an even more uniform illumination and distortion values of less than 1%. The six element lens is the cost-effective alternative that also impresses by its compactness which even allows the insertion into the Focus-Mount helical focuser for the use with bellowless panoramic or shift cameras.

The use of the neutral gray Rodenstock center filters is recommended for critical motifs to make best use of the image circle without irritating light fall-off to the image corners.

Grandagon-N	Max. recommended film format
65 mm f/4.5	9×12 cm / 4×5 in.
75 mm f/4.5	9×12 cm / 4×5 in.
90 mm f/4.5	13×18 cm / 5×7 in.
90 mm f/6.8	9×12 cm / 4×5 in.

Data sheets

Formats, dimensions, shutter data, image circles, movement ranges

Performance data Grandagon-N 90 mm f/4.5

Performance data Grandagon-N 90 mm f/6.8

Grandagon-N: the "space expander" for situations where space is limited

Grandagon-N

Back to lens description

Formats, shutter sizes, dimensions, weight

Lens	Max. recommended film format	Shutter size	Push-on mount Ø	Filter thread	Rear barrel Ø	Flange focal length [1]	Overall length	Weight w/Copal
65 mm f/4.5	9×12 cm / 4×5 in.	0	60 mm	M 58×0.75	51.0 mm	70.0 mm	63.5 mm	330 g
75 mm f/4.5	9×12 cm / 4×5 in.	0	70 mm	M 67×0.75	60.0 mm	82.0 mm	73.5 mm	440 g
90 mm f/4.5	13×18 cm / 5×7 in.	1	85 mm	M 82×0.75	70.0 mm	98.0 mm	88.5 mm	700 g
90 mm f/6.8	9×12 cm / 4×5 in.	0	70 mm	M 67×0.75	60.0 mm	94.0 mm	78.5 mm	460 g

[1]) With Copal shutter for scale 1:∞

Shutter data

Shutter type and size	Shutter speeds range	Manual cocking	Self cocking	Mechanical	Electronic	x-synchronized	Smallest f-stop increments	Screw thread	Lens board opening	Lens board thickness	Accessories required
Copal 0	B, T, 1/500 s … 1 s	•		•		•		M 32.5×0.5	34.8 mm	1.5 … 4.0 mm	
Copal 1	B, T, 1/400 s … 1 s	•		•		•		M 39×0.75	41.8 mm	1.5 … 3.0 mm	
Copal Press 0	B, 1/125 s … 1 s		•	•		•		M 32.5×0.5	34.8 mm	1.5 … 3.0 mm	
Copal Press 1	B, 1/125 s … 1 s		•	•		•		M 39×0.75	41.8 mm	1.5 … 2.0 mm	
Rollei Electron. 0	B, 1/500 s … 30 s				•	•	1/10	M 39×0.75	41.8 mm	1.5 … 3.0 mm	Control Unit
Rollei Electron. 1	B, 1/300 s … 30 s				•	•	1/10	M 39×0.75	41.8 mm	1.5 … 3.0 mm	Control Unit

Working apertures, image angles, image circles and movement ranges

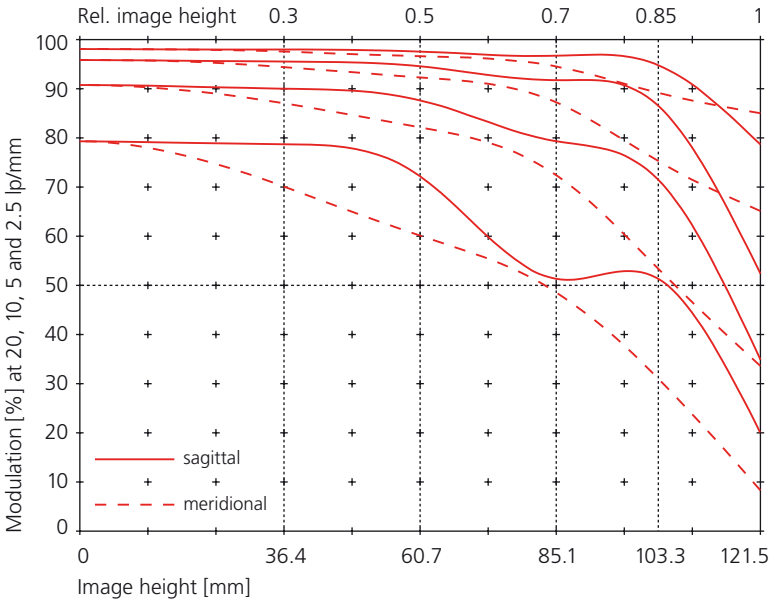
Lens	Image scale	Working f-stop	Image angle	Image circle diameter	Movement range [mm] [2]) vertical/horizontal (landscape format) 6×7 cm	6×9 cm	6×12 cm	4×5 in.	5×7 in.	8×10 in.
65 mm f/4.5	1:∞	16-22	105°	170 mm	50 / 46	46 / 36	35 / 23	12 / 10		
75 mm f/4.5	1:∞	16-22	105°	195 mm	63 / 59	59 / 49	51 / 36			
90 mm f/4.5	1:∞	16-22	105°	236 mm	85 / 80	81 / 70	75 / 58	54 / 48	21 / 16	
90 mm f/6.8	1:∞	22-32	102°	221 mm	77 / 73	73 / 63	67 / 50	45 / 39	10 / 7	

[2]) These values apply to the recommended working aperture at the given scale; with increasing scale, image circle and movement ranges increase

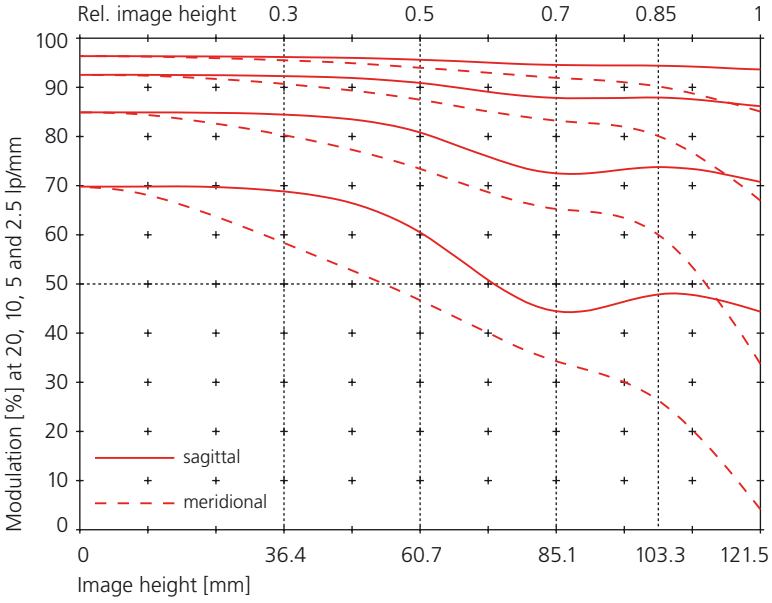
Grandagon-N 90 mm f/4.5

Back to lens description

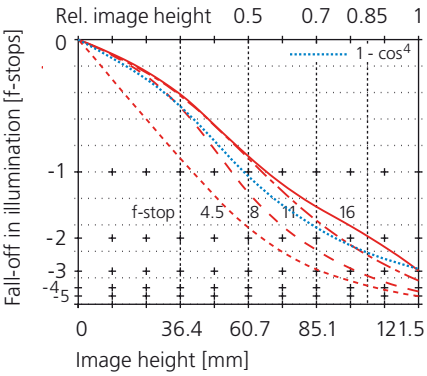
Modulation transfer function **Scale 0.03x** **f-stop 11**



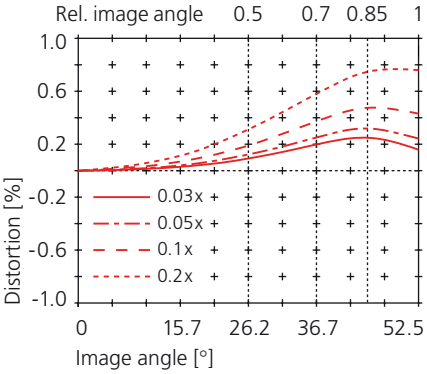
Modulation transfer function **Scale 0.03x** **f-stop 22**



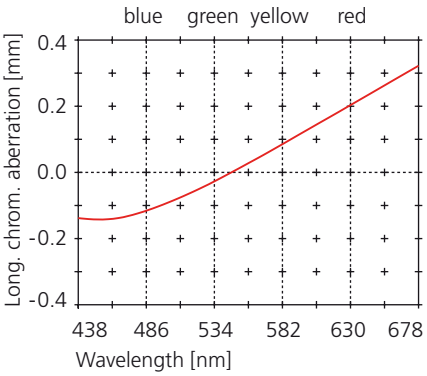
Fall-off in illumination **Scale 0.03x**



Distortion **Scale 0.03x ... 0.2x**



Long. chrom. aberration **Scale 0.03x**

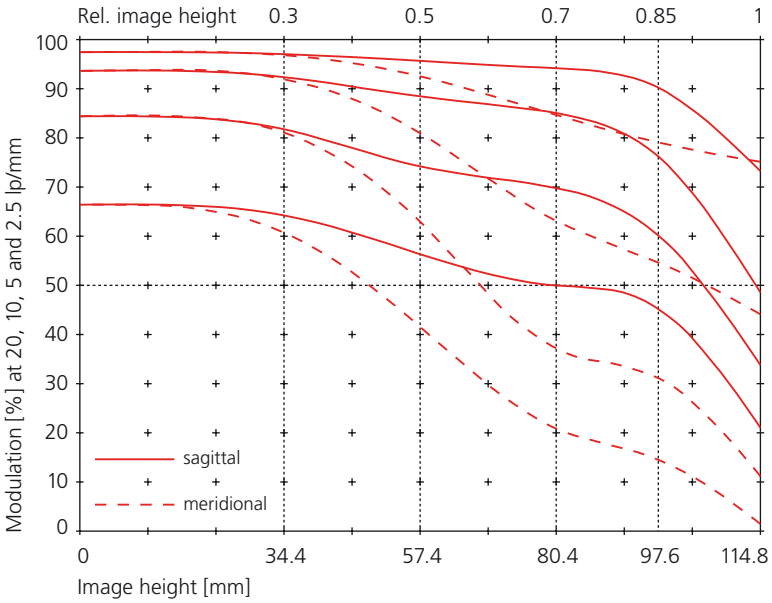


All spatial frequencies [line pairs/mm], image heights [mm] and scales are related to the film or sensor side

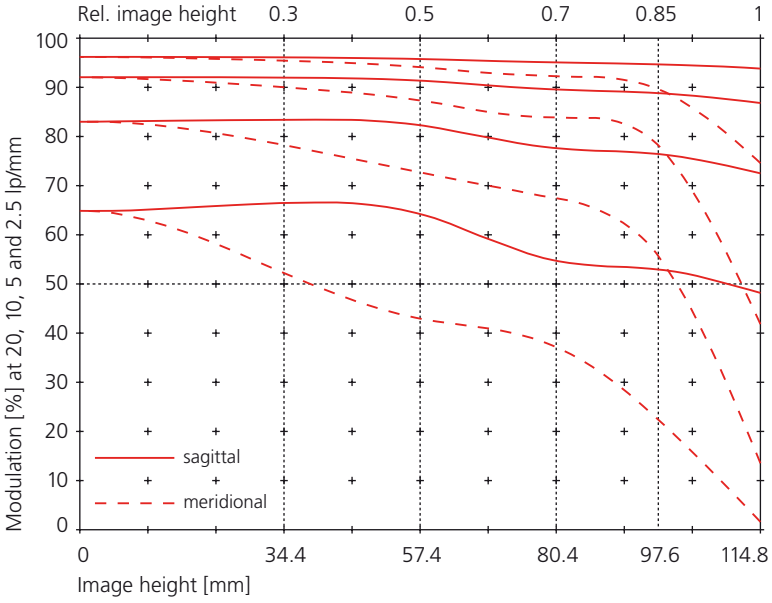
Grandagon-N 90 mm f/6.8

Back to lens description

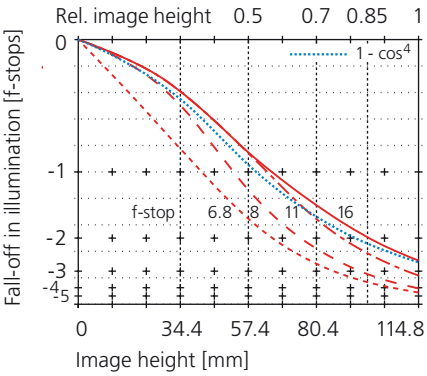
Modulation transfer function Scale 0.03x f-stop 11



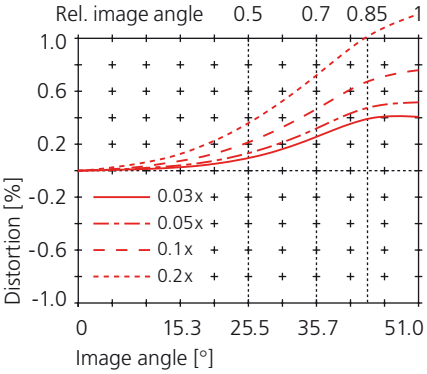
Modulation transfer function Scale 0.03x f-stop 22



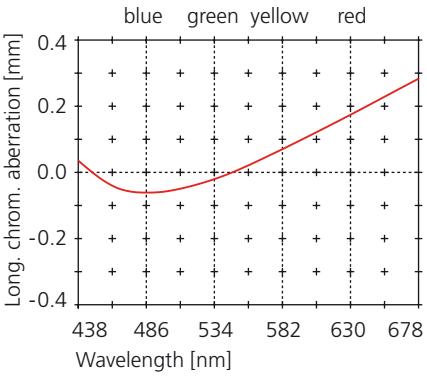
Fall-off in illumination Scale 0.03x



Distortion Scale 0.03x ... 0.2x



Long. chrom. aberration Scale 0.03x



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

Back to analog photography

Apo-Sironar-S
Apo-Macro-Sironar
Apo-Grandagon
Grandagon-N

Accessories: Center filters
Accessories: Focus-Mount

Lenses for Analog Professional Photography

Accessories: Center filters

For critical shots (e.g. with areas of uniform brightness towards the image corners) the physically inevitable light fall-off according to the "$\cos^4$ law" can be eliminated by using the neutral gray Rodenstock center filters available for all Apo-Grandagon and Grandagon-N lenses (see table). A center filter should always be used if the image circle of a wide angle lens is used right up to the vicinity of the circumference.

Rodenstock center filters are concentric graduated neutral gray filters whose density decreases from the center up to the transparent rim. The fall in density compensates for practically all the light fall-off to the image edge from a working f-stop of 16. The exposure must be corrected by 1.5 or 2.5 stops. This corresponds to a correction of the exposure time by a factor of 3 or 5 respectively (either aperture or exposure time have to be corrected, not both at the same time).

Apo-Grandagon & Grandagon-N	Filter thread	Exp. correction f-stops	/ time
35 mm f/4.5	E 67/86	+2.5	5×
45 mm f/4.5	E 67/86	+2.5	5×
55 mm f/4.5	E 67/86	+2.5	5×
65 mm f/4.5	E 58/77	+1.5	3×
75 mm f/6.8 *	E 58/77	+1.5	3×
75 mm f/4.5	E 67/86	+1.5	3×
90 mm f/6.8	E 67/86	+1.5	3×
90 mm f/4.5	E 82/112	+1.5	3×
115 mm f/6.8 *	E 82/112	+1.5	3×

* This lens is no longer produced; however, the matching center filter is still available for later completion

Center filter: for even illumination with ultra-wide angle large format lenses

Back to analog photography

Apo-Sironar-S
Apo-Macro-Sironar
Apo-Grandagon
Grandagon-N

Accessories: Center filters
Accessories: Focus-Mount

Lenses for Analog Professional Photography

Accessories: Focus-Mount

Using large format lenses on cameras without bellows such as panoramic or shift cameras requires the use of a focusing facility. The Focus-Mount can be combined with all Rodenstock lenses in shutter size 0.

Existing lenses can be installed at a later date.

The Focus-Mount ensures precise focusing and the non-rotating lens mount means that all operating elements and scales of the shutter remain in the same position for best reading and handling. The lenses which can be used as well as their focusing ranges can be found in the table.

More information on applications and adaption are available on request for the case that the manufacturer of your camera cannot help you.

Lens		Focusing range
Apo-Grandagon	35 mm f/4.5	∞ – 0.4 m / 1.5 ft
	45 mm f/4.5	∞ – 0.6 m / 2.0 ft
	55 mm f/4.5	∞ – 0.9 m / 3.0 ft
Grandagon-N	65 mm f/4.5	∞ – 0.8 m / 2.5 ft
	75 mm f/4.5	∞ – 1.0 m / 3.5 ft
	90 mm f/6.8	∞ – 1.3 m / 5.0 ft
Apo-Sironar-S	100 mm f/5.6	∞ – 1.8 m / 6.0 ft
	135 mm f/5.6	∞ – 3.0 m / 10 ft
	150 mm f/5.6	∞ – 3.5 m / 12 ft
Apo-Sironar-N	150 mm f/5.6	∞ – 3.5 m / 12 ft

Focus-Mount: makes it possible to use excellent Rodenstock lenses with shift and panoramic cameras

Back to general overview

Rogonar
Rogonar-S
Rodagon
Apo-Rodagon-N
Rodagon-WA
Apo-Rodagon-D

Accessories: Modular-Focus

Lenses for Enlarging, CCD Photos and Video

To reproduce analog photographs as pictures on paper requires two optical imaging processes: One to put the image onto the film and one to enlarge the image onto the paper. The second image reproduction process is no less important for the quality of the final result than the first. When selecting your enlarging lens, you therefore need to be just as critical as when you purchase your high-quality taking lens: take only the very best.

Rodenstock offers a wide range of those lenses which provides an optimal solution for any application: The breadth of the Rodenstock enlarging lens range begins with the 3 elements model for the cost-conscious and ends with sophisticated high-power, apochromatically corrected 7 elements lenses. Rodenstock has the suitable enlarging lens …

- For the ambitious amateur in his or her darkroom as well as for the professional in his laboratory;
- For all enlargers from amateur models, professional enlargers and printers right up to professional vertical and horizontal cameras;
- For numerous film sizes up to sheet film 4×5 in. and for all CCD area and line sensors;
- For all reproduction scales from 1:1 for the manufacture of duplicates up to almost infinity for biggest enlargements.

Rodenstock guarantees a lens quality which the photographer and the printer can always rely on and which allows both to expect the best possible photographic results. Furthermore, not only the optical performance but also a variety of mechanical features offer practical benefits in the use of the lenses:

- The click-stop diaphragm allows a fast and precise setting of a stop value even when the room is completely dark.
- The pre-set aperture makes it possible to set a working aperture that can be put into operation by simply turning a ring to a stop after the picture has been composed and focused.
- The illuminated f-stop display shows the f-stop set without the room lighting having to be switched on.
- The infinite stop setting allows exact stopping down when analysers with pre-set exposure times are used.

Rodenstock lenses guarantee that in the imaging process from the negative or transparency to the print no detail is lost that has been captured by your valued camera lens

Back to enlarging lenses

Rogonar
Rogonar-S
Rodagon
Apo-Rodagon-N
Rodagon-WA
Apo-Rodagon-D

Accessories: Modular-Focus

Lenses for Enlarging, CCD Photos and Video

Rogonar

The Rogonar forms a solid base for the "first steps" in the amateur's home lab. This lens is already a standard feature of many low-price enlarging units.

With 3 single elements, it has a relatively simple optical design. But when used for a smaller scale range of about 2× to 8× and at a working aperture of f/11, it still offers good results.

The large aperture for a 3 element lens ensures simple and precise focusing and provides a bright image for composition and cropping of the picture.

The Rogonar is available with the standard focal length of 50 mm for 35 mm film. It has a click-stop diaphragm and an illuminated f-number scale.

Rogonar	Recommended scale range	Maximum film format
50 mm f/2.8	2× - 8×	24×36 mm

Data sheets

Formats, dimensions, recommended scales, features

Performance data Rogonar 50 mm f/2.8

Rogonar: the low-priced starter for the amateur darkroom

Rogonar

Back to lens description

Technical data

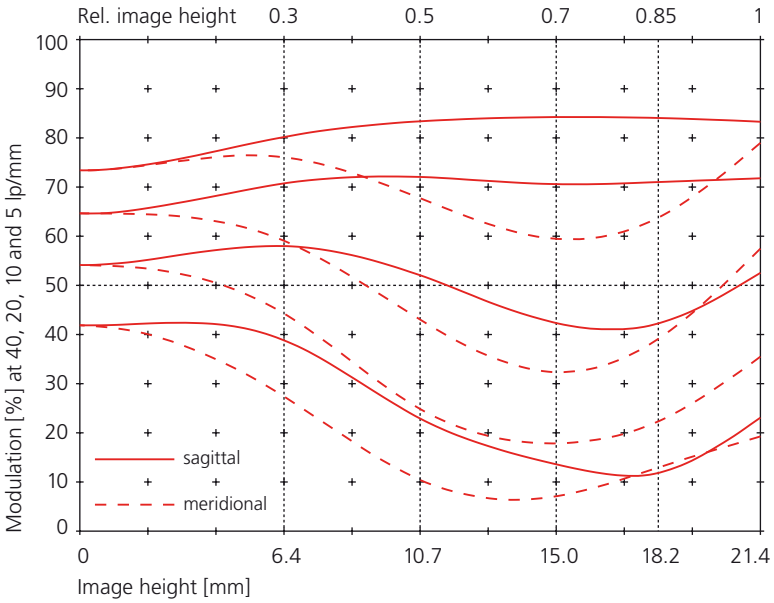
Lens	Maximum film format	Scale range	Smallest aperture	Pre-selection aperture	Click-stop disable	Illuminated f-stop display	Filter thread	Flange focal length [1)]	Overall length	Max. diameter	Screw thread	Flange to rear edge
50 mm f/2.8	24×36 mm	2-8×	16	-	-	•	M 30.5×0.5	38.0 mm	32.0 mm	42.0 mm	M 39×1/26"	6.5 mm

[1)] Flange focal length at scale ∞

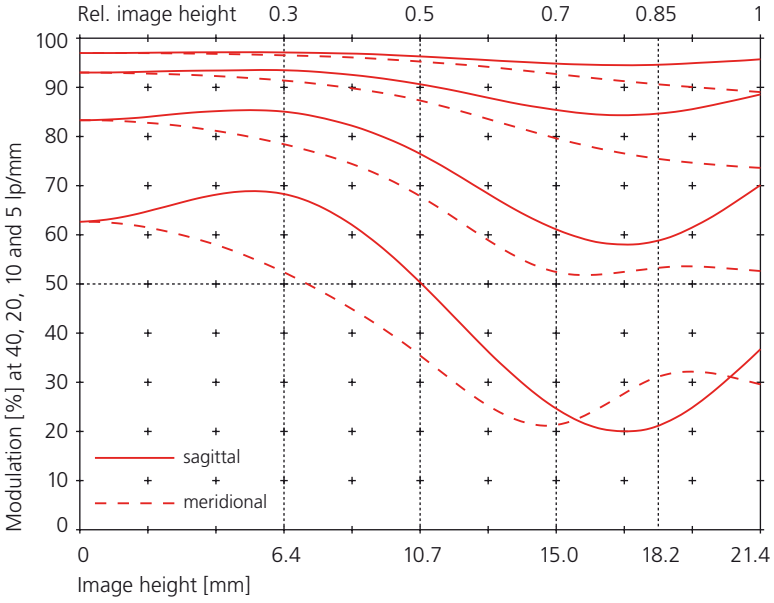
Rogonar 50 mm f/2.8

Back to lens description

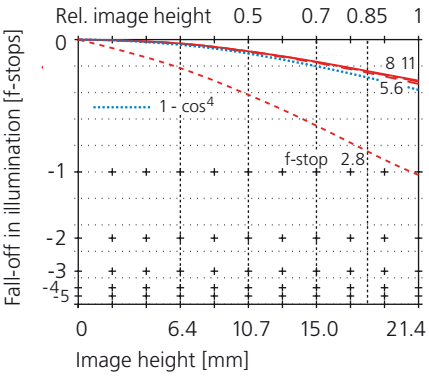
Modulation transfer function **Scale 4x** **f-stop 2.8**



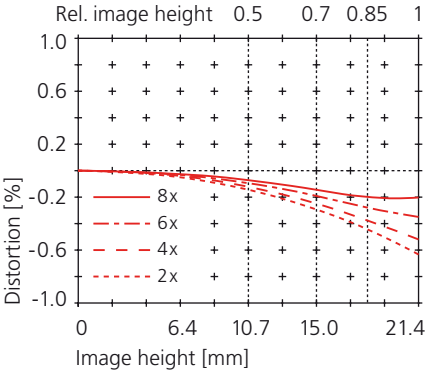
Modulation transfer function **Scale 4x** **f-stop 5.6**



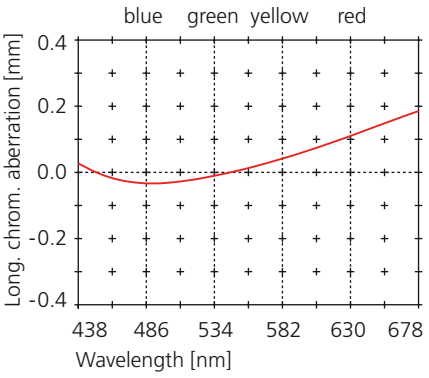
Fall-off in illumination **Scale 4x**



Distortion **Scale 8x ... 2x**



Long. chrom. aberration **Scale 4x**



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

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Rogonar
Rogonar-S
Rodagon
Apo-Rodagon-N
Rodagon-WA
Apo-Rodagon-D

Accessories: Modular-Focus

Lenses for Enlarging, CCD Photos and Video

Rogonar-S

The universal lens Rogonar-S has a relatively simple optical design and so a very attractive price. But the very high performance capability of this lens makes it ideal for the high requirements of demanding amateurs or professional labs.

The main application area of the Rogonar-S is enlargement in the scale range required for photographs in the standard formats. In this range, the lens with 4 elements in 3 groups provides high-quality results with only low light fall-off to the picture margin. Stopping down by 2 to 3 stops is recommended for optimal contrast und sharpness up to the image corners.

The recommended scale range can also offer some interesting possibilities for cropped enlargements.

The Rogonar-S can be supplied in several models for use for all film sizes up to roll film 6×9 cm. It is equipped with a click-stop diaphragm which can be disabled on the models from 50 mm to 105 mm focal length for stepless control which is helpful for the use of analysers or timers with pre-set exposure time mode. All models from a focal length of 50 mm on have an illuminated aperture display and a practical pre-set aperture for fast switching from fully open to the working f-stop.

Rogonar-S	Recommended scale range	Maximum film format
25 mm f/4	10× - 30×	13×17 mm
35 mm f/2.8	10× - 30×	18×24 mm
50 mm f/2.8	2× - 10×	24×36 mm
60 mm f/4.5	2× - 10×	40×40 mm
75 mm f/4.5	2× - 10×	6×6 cm
90 mm f/4.5	2× - 8×	6×7 cm
105 mm f/4.5 *	2× - 8×	6×9 cm

* Discontinued model, leftover stock only

Data sheets

Formats, dimensions, recommended scales, features

Performance data Rogonar-S 50 mm f/2.8

Rogonar-S: a reasonably priced lens with remarkably good performance for standard prints

Rogonar-S

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Technical data

Lens	Maximum film format	Scale range	Smallest aperture	Pre-selection aperture	Click-stop disable	Illuminated f-stop display	Filter thread	Flange focal length [1]	Overall length	Max. diameter	Screw thread	Flange to rear edge
25 mm f/4	13×17 mm	10-30×	16				M 30.5×0.5	23.0 mm	28.0 mm	40.5 mm	M 32.5×0.5 [2]	4.5 mm
35 mm f/4	18×24 mm	10-30×	16				M 30.5×0.5	34.0 mm	28.0 mm	40.5 mm	M 32.5×0.5 [2]	4.5 mm
50 mm f/2.8	24×36 mm	2-10×	16	•	•	•	M 40.5×0.5	47.0 mm	37.5 mm	50.0 mm	M 39×1/26"	6.5 mm
60 mm f/4.5	40×40 mm	2-10×	22	•	•	•	M 40.5×0.5	52.5 mm	36.5 mm	50.0 mm	M 39×1/26"	5.9 mm
75 mm f/4.5	6×6 cm	2-10×	22	•	•	•	M 40.5×0.5	65.5 mm	36.5 mm	50.0 mm	M 39×1/26"	5.9 mm
90 mm f/4.5	6×7 cm	2-8×	22	•	•	•	M 40.5×0.5	80.0 mm	36.5 mm	50.0 mm	M 39×1/26"	5.9 mm
105 mm f/4.5	6×7 cm	2-8×	22	•	•	•	M 40.5×0.5	95.0 mm	36.5 mm	50.0 mm	M 39×1/26"	5.9 mm

[1]) Flange focal length at scale ∞, [2]) Adapter for M 39×1/26" supplied

Rogonar-S 50 mm f/2.8

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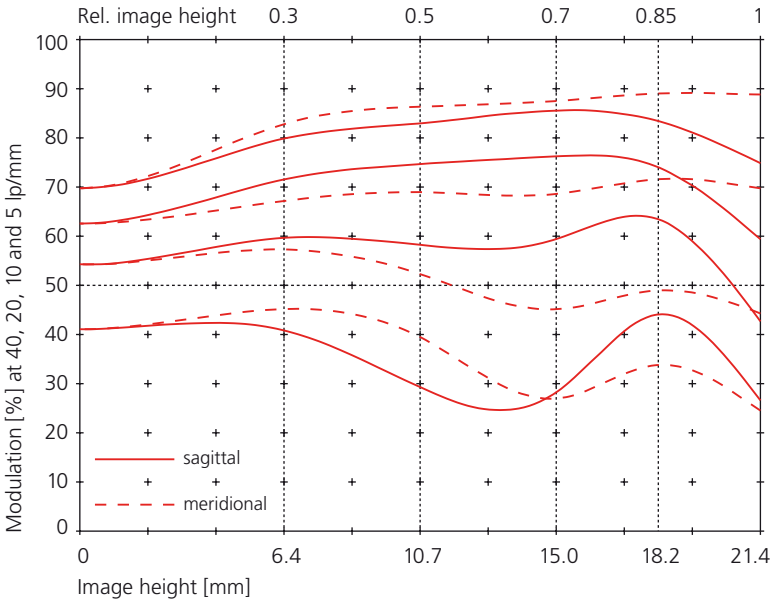
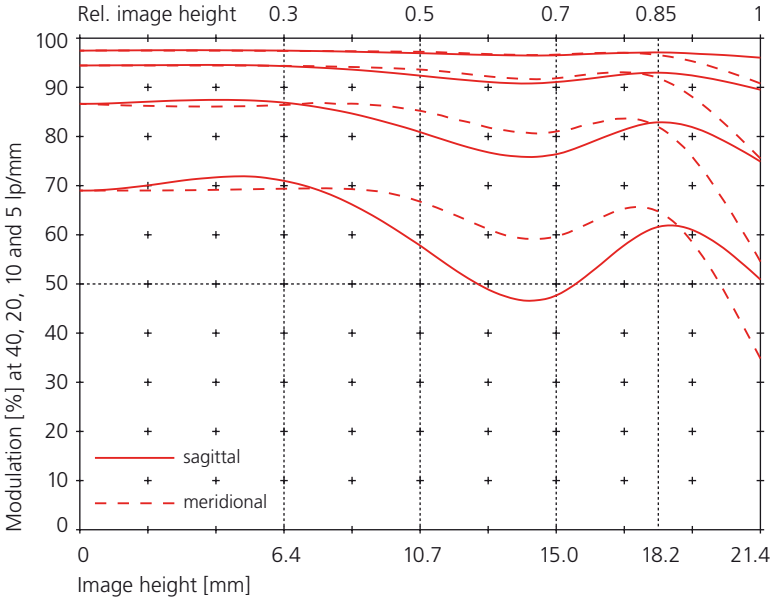
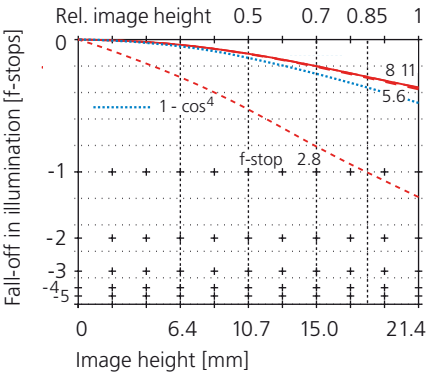
Modulation transfer function **Scale 10x** **f-stop 2.8**



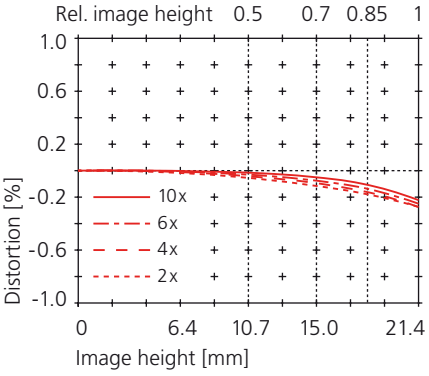
Modulation transfer function **Scale 10x** **f-stop 5.6**



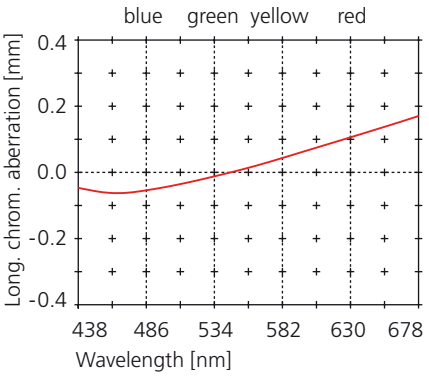
Fall-off in illumination **Scale 10x**



Distortion **Scale 10x ... 2x**



Long. chrom. aberration **Scale 10x**



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

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Rogonar
Rogonar-S
Rodagon
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Apo-Rodagon-D

Accessories: Modular-Focus

Lenses for Enlarging, CCD Photos and Video

Rodagon

The lens type Rodagon, with brilliant reproduction over the whole scale range of conventional enlargers, has become the universal workhorse of both demanding amateurs and professionals in practical use. Furthermore, the models with focal lengths up to 135 mm have proven to be excellent macro lenses for SLR cameras and to be high-resolution taking lenses for CCD cameras in combination with the Rodenstock focusing device Modular-Focus.

The 6 elements design guarantees the resolution of the finest details while maintaining a uniformly high contrast from the picture center to the edges. As the lens is nearly independent with regard to magnification scale, top quality is ensured from mini-prints right up to high enlargements. The recommended working aperture is reached by stopping down by only 2 stops from open aperture.

All Rodagon lenses are equipped with an illuminated f-stop display, a practical pre-set aperture und a click-stop diaphragm which can be switched to stepless control for focal lengths up to 135 mm. The Rodagon 28 mm is also available in a smaller barrel with a 32.5 mm thread mount, without pre-set aperture, without illumination of the f-stop scale and with a click-stop aperture ring that cannot be disabled.

Rodagon	Recommended scale range	Maximum film format
28 mm f/4	5× - 30×	18×24 mm
35 mm f/4	5× - 30×	24×24 mm
50 mm f/2.8	2× - 15×	24×36 mm
60 mm f/4	2× - 10×	40×40 mm
80 mm f/4	2× - 10×	6×7 cm
105 mm f/5.6	2× - 10×	6×9 cm
135 mm f/5.6	2× - 10×	4×5 inch
150 mm f/5.6	2× - 10×	4×5 inch

Data sheets

Formats, dimensions, recommended scales, features

Performance data Rodagon 50 mm f/2.8

Rodagon: the all-round lens for professional quality in the lab as well as for macro and CCD/CMOS shots

Rodagon

Back to lens description

Technical data

Lens	Maximum film format	Scale range	Smallest aperture	Pre-selection aperture	Click-stop disable	Illuminated f-stop display	Filter thread	Flange focal length [1]	Overall length	Max. diameter	Screw thread	Flange to rear edge
28 mm f/4	18×24 mm	5-30×	16				M 30.5×0.5	27.7 mm	30.0 mm	40.5 mm	M 32.5×0.5 [2]	6.7 mm
28 mm f/4	18×24 mm	5-30×	16	•	•	•	M 40.5×0.5	23.0 mm	37.2 mm	50.0 mm	M 39×1/26"	6.5 mm
35 mm f/4	24×24 mm	5-30×	16	•	•	•	M 40.5×0.5	31.2 mm	37.2 mm	50.0 mm	M 39×1/26"	6.5 mm
50 mm f/2.8	24×36 mm	2-15×	16	•	•	•	M 40.5×0.5	43.5 mm	43.5 mm	50.0 mm	M 39×1/26"	13.0 mm
60 mm f/4	40×40 mm	2-10×	22	•	•	•	M 40.5×0.5	56.0 mm	41.8 mm	50.0 mm	M 39×1/26"	10.2 mm
80 mm f/4	6×7 cm	2-10×	22	•	•	•	M 40.5×0.5	74.5 mm	44.5 mm	50.0 mm	M 39×1/26"	13.7 mm
105 mm f/5.6	6×9 cm	2-10×	32	•	•	•	M 40.5×0.5	101.5 mm	42.3 mm	50.0 mm	M 39×1/26"	11.6 mm
135 mm f/5.6	4×5 inch	2-10×	32	•	•	•	M 40.5×0.5	128.0 mm	45.5 mm	50.0 mm	M 39×1/26"	14.5 mm
150 mm f/5.6	4×5 inch	2-10×	45			•	M 52×0.75	146.0 mm	49.8 mm	60.0 mm	M 50×0,75	20.1 mm

[1]) Flange focal length at scale ∞, [2]) Adapter for M 39×1/26" supplied

Rogonar-S 50 mm f/2.8

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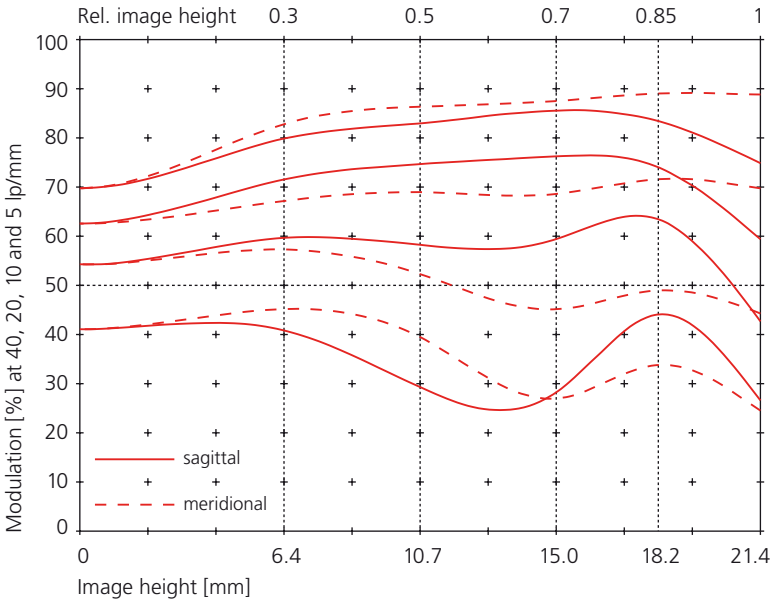
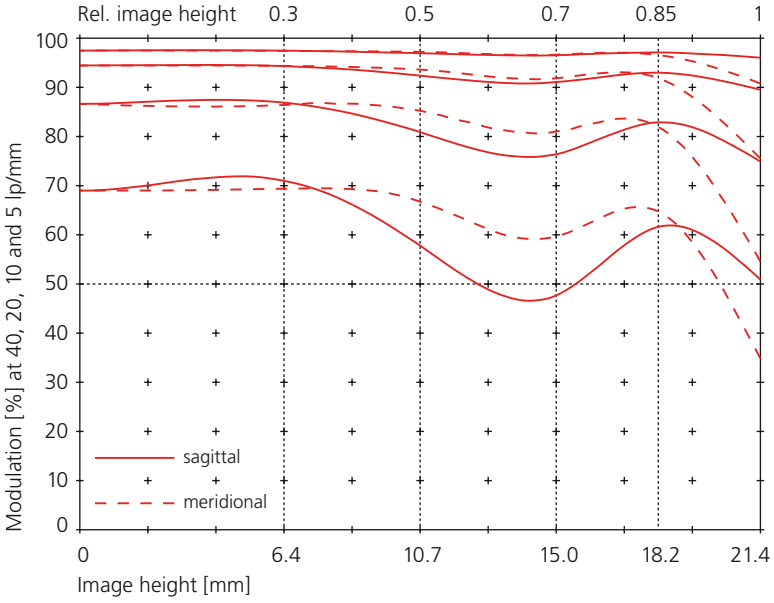
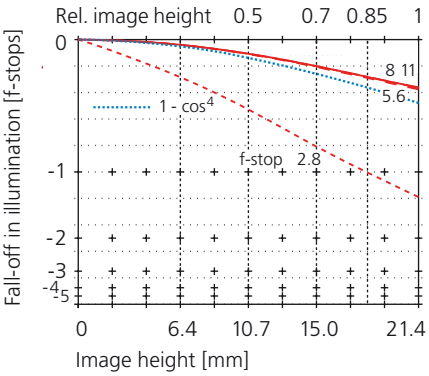
Modulation transfer function **Scale 10x** **f-stop 2.8**



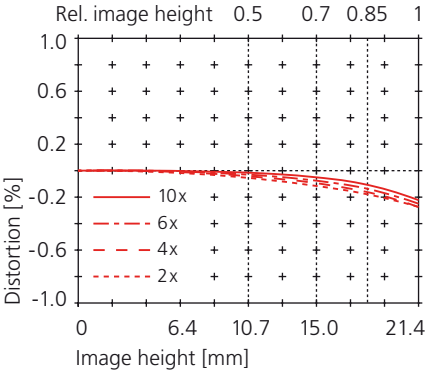
Modulation transfer function **Scale 10x** **f-stop 5.6**



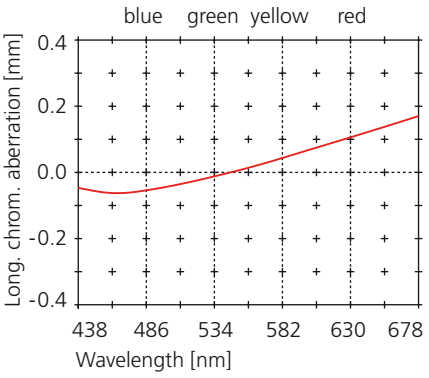
Fall-off in illumination **Scale 10x**



Distortion **Scale 10x ... 2x**



Long. chrom. aberration **Scale 10x**



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

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Rodagon-WA
Apo-Rodagon-D

Accessories: Modular-Focus

Lenses for Enlarging, CCD Photos and Video

Apo-Rodagon-N

The apochromatically corrected high-performance lenses of the Rodenstock Apo-Rodagon-N series guarantee perfect results which will satisfy even the highest demands.

The correction of these excellent lenses with up to 8 elements was taken to the absolute limits and so ensures the full elimination of irritating visible color fringes on high-contrast structures. All monochromatic imaging errors have also been greatly reduced to give this lens type its unsurpassed image reproduction performance.

The advantages are clearly visible in both color and black and white enlargements. The Apo-Rodagon-N is therefore the amateur's and professional's first choice whenever the very highest reproduction quality is required.

The optimal working aperture is reached by stopping down by only 1 to 2 stops.

For the use of these lenses as taking lenses for close up and macro photography with 35 mm SLR cameras as well as for use as high resolution taking lenses with CCD still and video cameras, the same applies as to the use of the Rodagon; however, the definition and the brilliance is still a little bit better.

All Apo-Rodagon-N models have a click-stop diaphragm and an illuminated f-stop display. They also offer a pre-set aperture and allow the click-stop to be disengaged for stepless control which is helpful for the use of analysers or timers with a pre-set exposure time mode.

Apo-Rodagon-N	Recommended scale range	Maximum film format
50 mm f/2.8	2× - 15×	24×36 mm
80 mm f/4	2× - 15×	6×7 cm
105 mm f/4	2× - 15×	6×9 cm

Data sheets

Formats, dimensions, recommended scales features

Performance data Apo-Rodagon-N 50 mm f/2.8

Apo-Rodagon-N: the unbeatable lens for the highest demands for definition and brilliance

Apo-Rodagon-N

Back to lens description

Technical data

Lens	Maximum film format	Scale range	Smallest aperture	Pre-selection aperture	Click-stop disable	Illuminated f-stop display	Filter thread	Flange focal length [1]	Overall length	Max. diameter	Screw thread	Flange to rear edge
50 mm f/2.8	24×36 mm	2-20×	16	•	•	•	M 40.5×0.5	46.0 mm	46.5 mm	50.0 mm	M 39×1/26"	15.7 mm
80 mm f/4	6×7 cm	2-15×	22	•	•	•	M 40.5×0.5	77.0 mm	43.0 mm	50.0 mm	M 39×1/26"	12.2 mm
105 mm f/4	6×9 cm	2-15×	22	•	•	•	M 40.5×0.5	99.1 mm	54.3 mm	50.0 mm	M 39×1/26"	18.0 mm

[1]) Flange focal length at scale ∞

Apo-Rodagon-N 50 mm f/2.8

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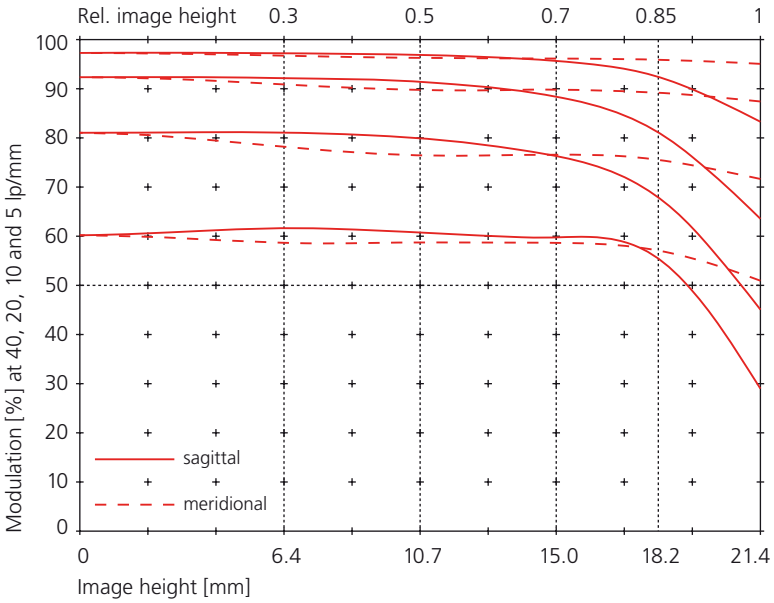
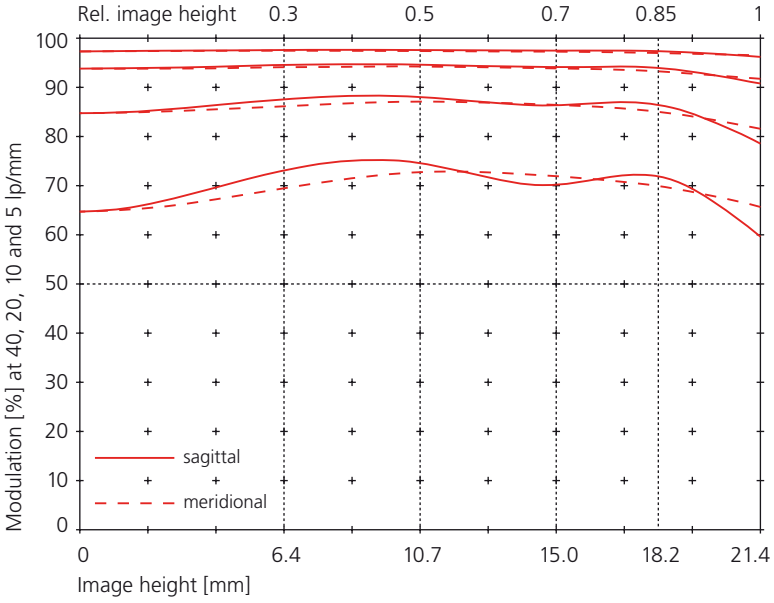
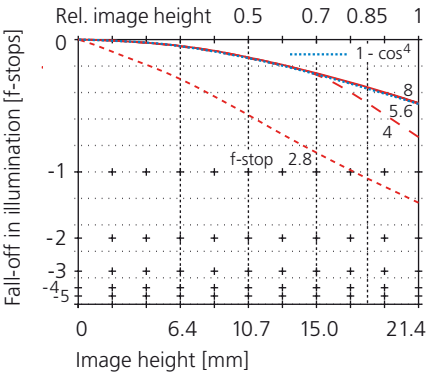
Modulation transfer function **Scale 10x** **f-stop 2.8**



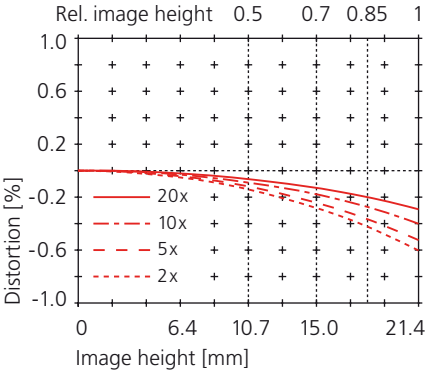
Modulation transfer function **Scale 10x** **f-stop 5.6**



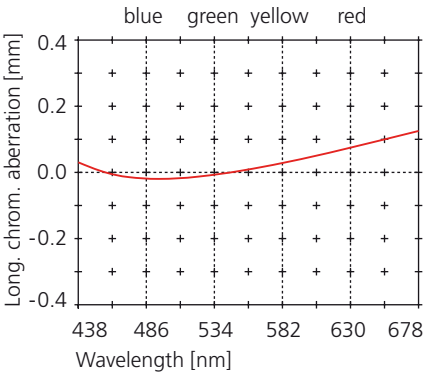
Fall-off in illumination **Scale 10x**



Distortion **Scale 20x ... 2x**



Long. chrom. aberration **Scale 10x**



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

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Apo-Rodagon-D

Accessories: Modular-Focus

Lenses for Enlarging, CCD Photos and Video

Rodagon-WA

The Rodagon-WA has a shorter focal length and a larger angle of view and hence it achieves a 70 % larger projection area than a conventional enlarging lens with standard focal length. It is therefore eminently suitable for section enlargements on units with relatively short columns. Clumsy wall or floor projections can so be avoided.

Thanks to the shorter projection distance, the negative carrier and the filter adjustment controls remain within reach of the hands and can still be operated easily when the enlarger's head is in top position for high enlargements.

The 6 elements Rodagon-WA provides the same reproduction performance as the Rodagon lens type.

The recommended working aperture is reached by stopping down by 2 stops. This guarantees shorter exposure times for higher efficiency and without or with less reciprocity failure for large format prints as well as for less loss in contrast by the influence of stray light during longer exposure times.

All Rodagon-WA models have a click-stop diaphragm and an illuminated f-stop display. They have a pre-set aperture and allow the click-stop to be disabled for stepless control for the use of analysers or timers with a pre-set exposure time mode.

Rodagon-WA	Recommended scale range	Maximum film format
40 mm f/4	4× - 20×	24×36 mm
60 mm f/4	4× - 15×	6×6 cm
80 mm f/4	4× - 15×	6×9 cm

Data sheets

Formats, dimensions, recommended scales features

Performance data Rodagon-WA 40 mm f/4

Rodagon-WA: the same professional quality as the Rodagon but with a smaller projection distance

Rodagon-WA

Back to lens description

Technical data

Lens	Maximum film format	Scale range	Smallest aperture	Pre-selection aperture	Click-stop disable	Illuminated f-stop display	Filter thread	Flange focal length [1]	Overall length	Max. diameter	Screw thread	Flange to rear edge
40 mm f/4	24×36 mm	4-20×	22	•	•	•	M 40.5×0.5	36.5 mm	37.2 mm	50.0 mm	M 39×1/26"	6.5 mm
60 mm f/4	6×6 cm	4-15×	22	•	•	•	M 40.5×0.5	55.5 mm	41.0 mm	50.0 mm	M 39×1/26"	10.0 mm
80 mm f/4	6×9 cm	4-15×	22	•	•	•	M 40.5×0.5	77.0 mm	44.0 mm	50.0 mm	M 39×1/26"	13.0 mm

[1]) Flange focal length at scale ∞

Rodagon-WA 40 mm f/4

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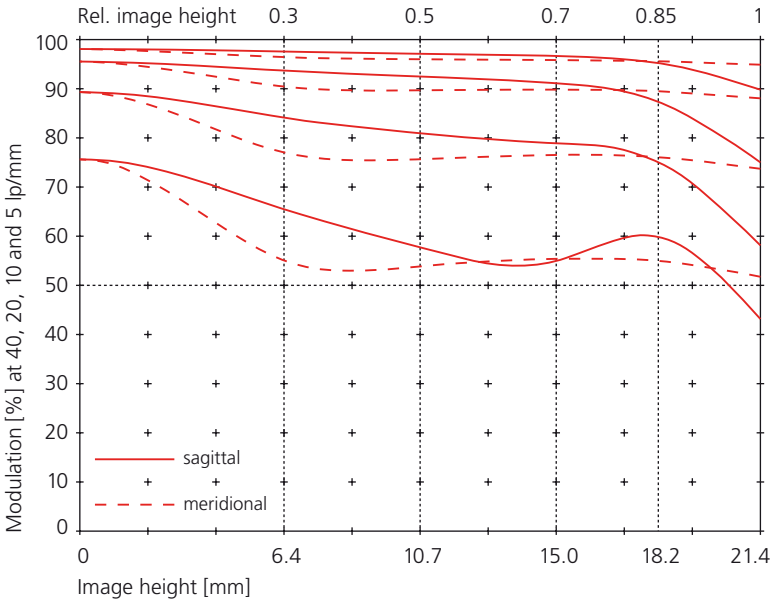
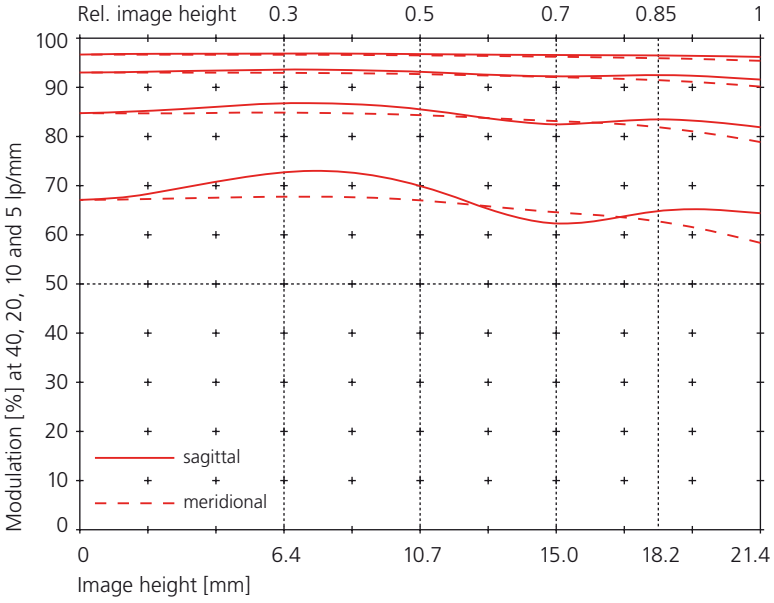
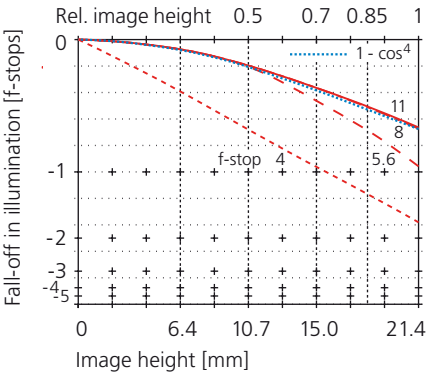
Modulation transfer function Scale 10x f-stop 4



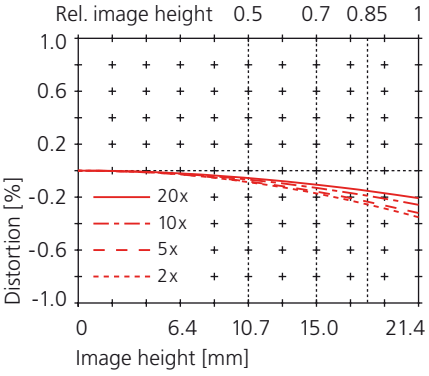
Modulation transfer function Scale 10x f-stop 8



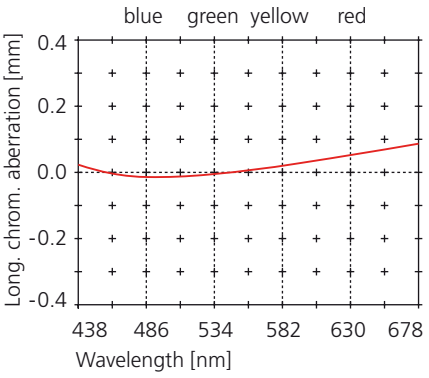
Fall-off in illumination Scale 10x



Distortion Scale 20x ... 2x



Long. chrom. aberration Scale 10x



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

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Accessories: Modular-Focus

Lenses for Enlarging, CCD Photos and Video

Apo-Rodagon-D

Apo-Rodagon-D lenses are designed for the highest possible imaging quality for close-ups at just those scales around 1:1 where even the best enlarging lenses for larger scales begin to show their weak spots.

Thus their typical applications are transparency duplication, the preparation of internegatives and – together with the Modular-Focus helical mount and the matching camera adapters – macro photography. Furthermore, as well as for photography, they can also be used as high resolving optical systems for premium scanners.

The 6 elements, apochromatically corrected lenses feature high contrast and sharpness right up to the picture corners with virtually no color fringes. Distortion is corrected almost to zero and cannot be seen even in critical subjects with straight-line structures parallel with the edges of the frame.

The optimum working aperture is between f/5.6 and f/8. This is worth mentioning because the effective aperture of a lens focused for a scale of about 1:1 is approximately two f-stops smaller than the nominal aperture and therefore stopping down to smaller apertures than nominal f/8 would result in visible blur because of diffraction. All three models are fitted with click-stop aperture rings which can be disabled and with pre-setting rings.

Apo-Rodagon-D 1x	Recommended scale range	Maximum film format
75 mm f/4	0.8× - 1.2×	6×6 cm
Apo-Rodagon-D 2x		
75 mm f/4.5	1.2× - 2.5×	6×7 cm
Apo-Rodagon-D		
120 mm f/5.6	0.5× - 3×	4×5 inch

The given scale ranges refer to projection; when the lenses are used as taking lenses the respective reciprocal values apply.

Data sheets

Formats, dimensions, recommended scales features

Performance data Apo-Rodagon-D 75 mm f/4

Apo-Rodagon-D: duplication and macro photography with practically no loss in definition and brilliance

Apo-Rodagon-D

Back to lens description

Technical data

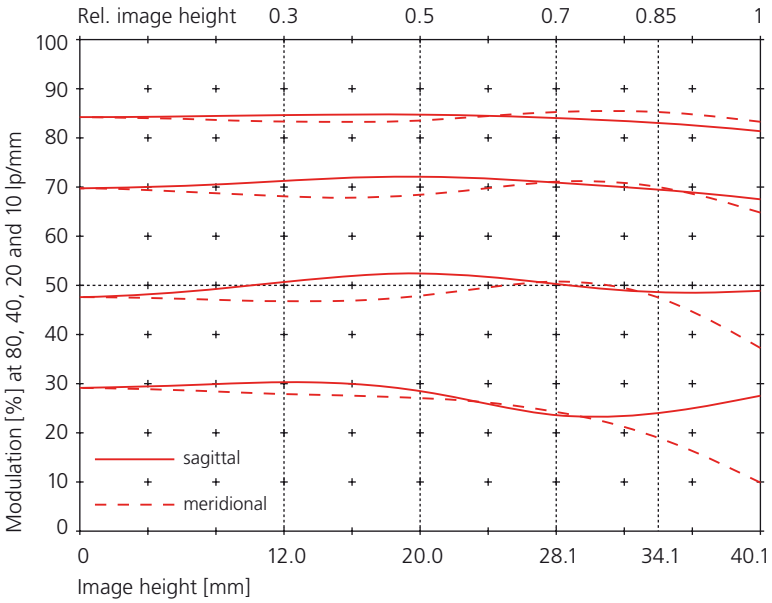
Lens	Maximum film format	Scale range	Smallest aperture	Pre-selection aperture	Click-stop disable	Filter thread	Flange focal length [1]	Overall length	Max. diameter	Screw thread	Flange to rear edge
75 mm f/4	6×6 cm	0.8-1.2×	22	•	•	M 40.5×0.5	136.7 mm	53.0 mm	50.0 mm	M 39×1/26"	18.7 mm
75 mm f/4.5	6×7 cm	1.2-2.5×	22	•	•	M 40.5×0.5	109.4 mm	43.0 mm	50.0 mm	M 39×1/26"	12.5 mm
120 mm f/5.6	4×5 inch	0.5-3×	32	•	•	M 40.5×0.5	172.9 mm	43.4 mm	50.0 mm	M 39×1/26"	12.7 mm

[1]) Flange focal length for Apo-Rodagon-D 1× 75 mm f/4 at scale 1:1, for 2x 75 mm f/4.5 and for 120 mm f/5.6 at scale 2x

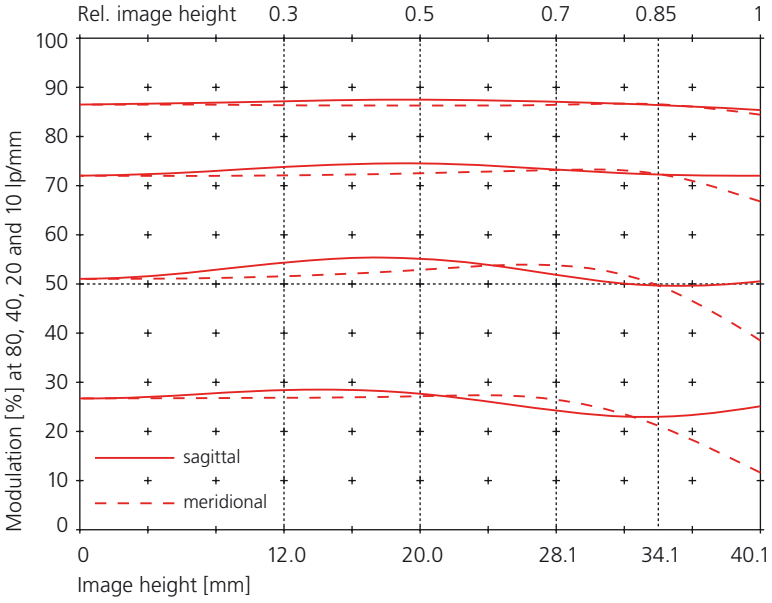
Apo-Rodagon-D 75 mm f/4

Back to lens description

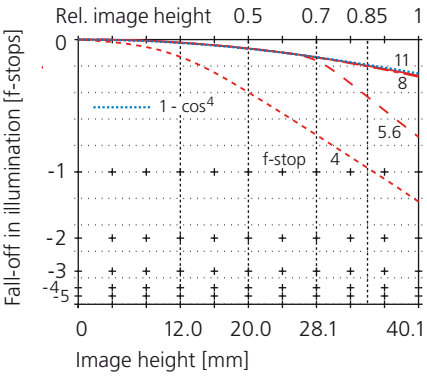
Modulation transfer function **Scale 1x** **f-stop 4**



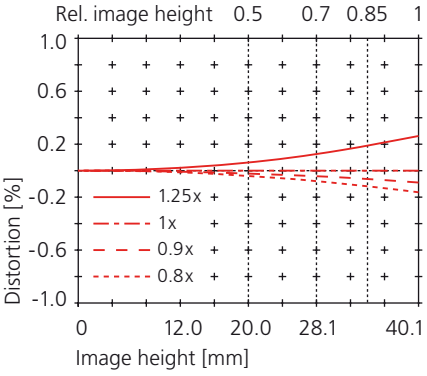
Modulation transfer function **Scale 1x** **f-stop 5.6**



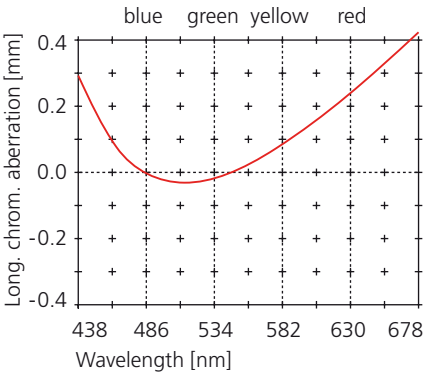
Fall-off in illumination **Scale 1x**



Distortion **Scale 1,25x ... 0.8x**



Long. chrom. aberration **Scale 1x**



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

Back to enlarging lenses

Rogonar
Rogonar-S
Rodagon
Apo-Rodagon-N
Rodagon-WA
Apo-Rodagon-D

Accessories: Modular-Focus

Lenses for Enlarging, CCD Photos and Video

Accessories: Modular-Focus

Enlarging lenses do not have a helical focusing facility because focusing is performed with the enlarger's bellows extension. If an enlarging lens is used as a taking lens, it is necessary to fit a focusing device. The Modular-Focus developed for this purpose has a stroke of 25 mm and offers high setting precision and stability to match our enlarging lenses' high image quality. The straight-line guide guarantees that the lens does not rotate with the focusing ring. Once the aperture display window has been adjusted for best readability by rotating the Modular-Focus against the adapter, and once it has been subsequently fixed, then it will permanently keep its optimum position.

The Modular-Focus can be fitted to almost all 35 mm system cameras by using a T2 adapter with conventional connecting rings. For the use with cameras with M42 lens thread there is a M42 correction ring. Furthermore, the Modular-Focus can also be fitted to professional CCD and video cameras with exchangeable lenses using the optional C mount connection.

For attaching the lens, three adapters with M 39×1/26" and M 32.5×0.5 thread are available. For lenses with illuminated f-stop display there is a special version (A) that blocks the entrance window for the light in order to avoid irritating stray light. Extension tubes with a length of 24.5 mm or 45 mm allow larger extensions for long focal lengths or very large scales.

Lens adapter ▸ for lens ▾		A	B	C
Rogonar-S	25 … 35 mm	–	–	●
	50 … 105 mm	●	●	–
Rodagon	28 mm	–	–	●
	28 … 105 mm	●	●	–
	135 mm	–	●	–
Apo-Rodagon-N	50 … 105 mm	●	●	–
Rodagon-WA	40 … 60 mm	●	●	–
	80 mm	–	●	–
Apo-Rodagon-D	1x, 2x 75 mm	–	●	–

A: M 39×1/26" special version that shuts out light from aperture display

B: M 39×1/26" standard version

C: M 32×0.5

Modular-Focus: Focusing device for most enlarging lenses to be used with photo, CCD and video cameras

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Special filters for digital photography

- HR Digital Circular Polarizer
- HR Digital UV Blocking Filter
- UV/IR Blocking Filter

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- Neutral Density Filters
- Skylight Filter
- Filters for b&w photos

Quality Filters

If it is too bright for taking photos or if the light is not neutral white, if there is too much UV radiation or if unwanted reflections occur on glossy surfaces? Or if the black and white mode of the digital camera or black and white film does not convert the object colors into the gray values the photographer really wants? Then Rodenstock quality filters can help.

Filters should never impair the lens quality. No one is willing to obtain the desired effects at the cost of blur, flare or ghost images. Rodenstock hard coated quality filters made from high-grade optical glass guarantee that sharpness, contrast and color faithfulness are maintained even with the best lenses.

- Filters can adapt the light to the film so that it "sees" like the eye or just as it is necessary to realize the effects desired by the photographer. The human eye in cojunction with the brain as a "feedback control circuit" can adapt easily to the varying conditions of brightness, contrast and color hue and "overlook" effects which create falsification for the lens and the film and which can lead to overexposure or color shift. Filters can frequently eliminate such errors, or at least reduce them to a negligible level.

- But filters can do more than just remedy defects. Sometimes the photographer will deliberately use a filter to achieve a better effect by deviating from the natural image. In these cases, too, the photographer wants to enhance the result so that once again only the best filters are good enough.

It is an erroneous view that filters would be obsolete for digital photography because of the "white balance" function of the cameras and the manifold manipulations that may be done later with imaging software on the computer. The truth is that in many cases (e.g. UV/IR blocking filters, ND filters and polarizers) filters cannot be replaced by later manipulation via software, and that in other cases (control of conversion of the object colors into gray values) filters are much more comfortabe and time saving in usage and provide much better results. On the other hand, imaging software allows different manipulations and corrections that cannot be executed with filters.

The Rodenstock HR Digital filters are multi-coated with seven layers plus an additional dirt and water repelling cover layer. For preventing from getting stuck, they have a better sliding brass filter frame with also has less thermal expansion.

Data sheets

- Filter order numbers for thread sizes up to E 58
- Filter oder numbers for thread sizes from E 60

Rodenstock quality filters are produced to the same very high standards as premium photo lenses

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- **HR Digital Circul. Polarizer**
- HR Digital UV Blocking Filter
- UV/IR Blocking Filter

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HR Digital Filters for digital photography

Circular Polarizing Filter

In a rotatable mount, this filter for analog as well as for digital photography contains a micro-thin polarizing film sandwiched between two protective glass plates. This film transmits light only in one polarization plane. Non-polarized normal light is reduced about by half without any further visible effect, roughly like by an ND filter 2×. In contrast, polarized light is either transmitted without hindrance, more or less reduced or even totally rejected by the polarizer, depending on the setting.

Light is polarized when slanted incident light is reflected from an electrically non-conducting surface like glass, varnish and plastics. Water has a very low conductivity (in comparison with metal) so that its reflections are polarized. Even reflections on aluminum are also polarized, because aluminum forms a non-conductive surface layer of aluminum oxide when it has been anodized for a better resistance and a layer of aluminum oxide and aluminum carbonate in air as an environmental process.

By turning the polarizing filter in its rotatable mount in front of the lens, it is possible to effectively control the intensity of reflections and the saturation of colors (e.g. in landscapes):

1. If the transmission direction of the polarizing filter runs parallel to the polarization plane, the reflection appears twice as bright, because the polarized reflected light is transmitted fully while the remaining light is reduced by about 50 %.

2. If the direction of vibration of the polarized light and the transmission direction of the polarizing filter are crossed, the reflection is reduced or even suppressed. At an incident angle of about 55° to 60° from the normal, this effect is strongest and the suppression practically complete. This angle depends on the refractive index of the surface according to Brewster's law. With smaller or larger angles the polarization decreases.

Circular polarizers have an additional film behind the polarizing film to avoid interference with beam splitters in the light path of SLR cameras (as they ar used for TTL meters and AF cells). This prevents from overexposure and AF malfunction.

Filter type	Time or aperture correction
HR Digital Circular Polarizer	2× - 3× 1 - 1.5 f-stops

Data sheets

- Filter order numbers for thread sizes up to E 58
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HR Digital Filters for digital photography

UV Blocking Filter

This glass filter has been design specificially for digital photography. It is practically neutral in color effect, transmits visible light without hindrance while cutting out ultra-violet (UV) radiation. Due to the short wavelength, UV is highly scattered and has a high intensity in hazy conditions as diffuse radiation. Because most sensors of digital cameras are also a little bit sensitive for ultra-violet (less than for infrared, but much more than your eye), they react with a blue-violet or even a red veil, giving the sky a brighter look, thus reducing the contrast of the clouds against the sky and making distance views pale.

Whilst under normal conditions, UV absorption of the glass of multi-elements lenses is sufficient to prevent the violet cast and loss in contrast caused by the weak UV radiation, in the high mountain regions and at the sea, the intensity of the UV radiation may be so strong that UV blocking filters are needed.

With a UV filter in front of the lens, especially warm colors like yellow, orange and red remain pure and distance views become clearer and crisper. Because of the very steep cut-off below 420 nm for UV, the absorption within the visible wavelength range is almost imperceptible, color balance remains neutral and you do not need to extend the exposure time or to set a larger aperture. This is why the UV blocking filter can also be used as a good lens protection, e.g. against salt water splashes, wind-borne sand or even finger-prints.

The filter glass of the HR Digital UV Blocking Filter is very thin (only 1.4 mm), and this allows a very slim frame that does not cause any vignetting even with wide-angle lenses.

The seven-layer multi-coating ensures high transmission and suppression of reflections for brilliant photos free from ghost and flare. An additional extremely scratch-resistant as well as dirt and water-repellent protection layer keeps the glass surface clean over a longer period and makes cleaning easier.

A brass filter frame prevents from quality degrading mechanical strain due to its very low thermal expansion coefficient.

Filter type	Time	or	aperture correction
HR Digital UV Blocking Filter	1×		0 f-stops

Data sheets

- Filter order numbers for thread sizes up to E 58
- Filter oder numbers for thread sizes from E 60

UV blocking filter: for pure colors, clear distance views and ideal for protecting the front element of the lens

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Special filters for digital photography

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- Skylight Filter
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Filters for digital photography

UV/IR Blocking Filter

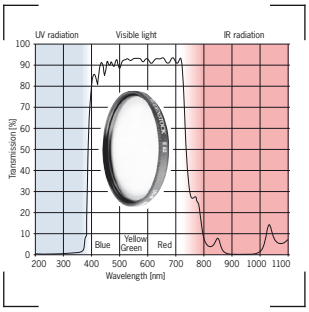
This glass filter is practically neutral in color effect. It transmits visible light without hindrance like the previously desdribed UV blocking filter while cutting not only ultra-violet (UV) radiation but also infrared (IR) radiation.

Due to the short wavelength, UV is highly scattered and has a high intensity in hazy conditions as diffuse radiation. Because most sensors of digital cameras are also a little bit sensitive for ultra-violet, they react with a blue-violet or even a red veil, giving the sky a brighter look, thus reducing the contrast of the clouds against the sky and making distance views pale.

In contrast to analog photography on film, in digital photography also the long-wave infrared radiation from the other end of the visible spectrum can degrade the image quality. This is due to the UV and (much higher) IR sensibility of the CCD and CMOS sensors. Therefore, an IR cut filter is used as or in addition to the protection glass in front of the sensor plane. However, experiance has shown that often its blocking capability is not sufficient if the IR radiation intensity is high. Then this results in color shift, loss of contrast and blur (because normal lenses are not aberration-corrected for the IR range).

Therefore, in critical situations the use of an additional highly effective UV/IR blocking filter in front of the camera lens is recommended. Its effect cannot be simulated by digital image processing. The Rodenstock UV/IR Blocking Filter provides a very high steepness of both flanks because it is an interference filter with multiple dielectric coatings. So it does not give rise to an irritating coloration except an almost invisible reduction of violet and very long-wave red, and therefore it can be used as a permanent lens protection glass, too.

Filter type	Time	or	aperture correction
UV/IR Blocking Filter	1×		0 f-stops



Data sheets

- Filter order numbers for thread sizes up to E 58
- Filter oder numbers for thread sizes from E 60

UV/IR blocking filter: a must for many digital cameras and a useful lens protection as well

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Special filters for digital photography

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Filters for analog and for digital photography

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- Skylight Filter
- Filters for b&w photos

Filters for analog and digital photography

Polarizing Filters (linear and circular)

In a rotatable mount, these filters contain a micro-thin polarizing film sandwiched between two protective glass plates. This film transmits light only in one polarization plane. However, non-polarized normal light consists of light waves vibrating in all possible directions at right angles to the direction of transmission. Therefore, normal light is reduced about by half without further visible effects, roughly like by an ND filter 2×, because one component (parallel with the polarization plane) passes the filter, and the other componen (perpendicular to the polarization plane) is blocked. In contrast, polarized light is either transmitted without hindrance, more or less reduced or even totally rejected by the polarizer, depending on the orientation angle between the polarizer's polarization plane and the vibration direction of the incident light.

Light is polarized when slanted incident light is reflected from electrically non-conducting surfaces like glass, varnish or plastics. However, water also has a very low conductivity (in comparison with metal) so that water reflections are polarized. All these reflections can be enhanced or reduced or almost eliminated with a polarizer. It is most effective if the angle of incidence on the reflecting surface or the angle between the line of vision of the camera towards this surface (e.g. a shop window or a glossy laquered wall) and its normal is about 55°.

Linear polarizers can be used with almost all non-SLR cameras (please see the manual). However, cameras with a beamsplitter in the light path (for AF control or TTL exposure measuring) are not compatible with linear polarizers as the polarizing effect of the beamsplitter interferes with that of the polarizer and this results in AF failure and/or overexposure respectively.

Circular polarizers avoid this problem. They have an additional optically effective film (a quarter-wave plate) behind the polarizing film in order to convert the linear polarization into circular polarization which does not interfere with the AF and TTL metering beamsplitter. This is the reason why circular polarizers are the recommended polarizers for all SLR cameras.

Filter type	Time or aperture correction
Linear Polarizer	2× - 3× 1 - 1.5 f-stops
Circular Polarizer	2× - 3× 1 - 1.5 f-stops

Polarizing filters: enhance or reduce or even eliminate reflections on electrically non-conducting surfaces, povide higher color saturation and enhance contrast

Data sheets

- Filter order numbers for thread sizes up to E 58
- Filter oder numbers for thread sizes from E 60

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- **UV Blocking Filter**
- Neutral Density Filters
- Skylight Filter
- Filters for b&w photos

Filters for analog and digital photography

UV Blocking Filter

This glass filter is practically neutral in color effect. It transmits visible light without hindrance while cutting out ultra-violet (UV) radiation. UV is highly scattered because of its very short wavelength and can reach high intensity as diffuse radiation in hazy conditions. A color film reacts with a blue-violet veil, the sensor of a digital camera may either show a blue-violet or a red veil, while b&w film gives the sky a brighter look when the intensity of the UV radiation ist high, thus reduces the contrast of the clouds against the sky and makes distance views pale.

Whilst under normal conditions, UV absorption of the glass of multi-elements lenses is sufficient to prevent the bluish cast and loss in contrast caused by the weak UV radiation, in the high mountain regions and at the sea, the intensity of the UV radiation may be so strong that UV blocking filters are needed.

With a UV filter in front of the lens, especially warm colors like yellow, orange and red remain pure and distance views become clearer and crisper. Because of the almost imperceptible absorption within the visible wavelength range, the color rendition remains neutral, and you do not need to extend the exposure time or to set a larger aperture.

Thanks to its totally neutral color rendition a UV blocking filter can also be used as a lens protection, e.g. against salt water splashes, wind-borne sand or even finger-prints.

Filter type	Time	or	aperture correction
UV Blocking Filter	1×		0 f-stops

Data sheets

- Filter order numbers for thread sizes up to E 58
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UV blocking filter: for pure colors, clear distance views and ideal for protecting the front element of the lens

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Special filters for digital photography

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- Skylight Filter
- Filters for b&w photos

Filters for analog and digital photography

Neutral Density (ND) Filters

These dyed-in-the-mass glass filters for analog and digital photography have a neutral gray tint and reduce all visible colors equally, e.g. by two f-stops. This allows motion blur (smear effect with panning camera) to be achieved with a longer exposure time than would otherwise be permitted by the brightness of the illumination and the film speed or sensor sensitivity. Alternatively it allows the generation of less depth of field with a larger aperture. Another application is the light reduction in situations where the brightness of the motif is too high for a correct exposure with the shortest exposure time available at the given film speed or sensor sensitivity.

WARNING: These ND filters must not be used as solar filters for observing the sun! For this purpose special solar filters are necessary with a much stronger absorption power not only within the visual range but also in the even more dangerous infrared range (which can burn the retina!).

ND filters are available in different densities for an extension of exposure time by a factor of 2, 4 or 8 or for an opening of the diaphragm by 1, 2 or 3 f-stops alternatively.

In a broader sense, center filters (gradation filters) are ND filters, too. These filters for wide-angle lenses of technical cameras with shift and tilt facilities are not dyed in the mass but are coated with an absorbing layer of high absorption (of 1.5 to 2.5 f-stops) in the center and a decreasing absorption to the margin. They reduce the light drop caused by the extremely large image angle. Because of this special application, center filters are described in detail as accessories for the Rodenstock lenses HR Digaron-S 23 mm and 28 mm as well as for all Grandagon-N and Apo-Grandagon lenses – please see there:

Filter type	Time	or	aperture correction
ND Filter 2×	2×		1 f-stop
ND Filter 4×	4×		2 f-stops
ND Filter 8×	8×		3 f-stops

Data sheets

- Filter order numbers for thread sizes up to E 58
- Filter oder numbers for thread sizes from E 60

- Center filter for HR Digaron-S
- Center filter for Grandagon-N and Apo-Grandagon

Neutral density filters: free choice of shutter speed and f-stop for creative effects or depth of field manipulation

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Special filters for digital photography

- HR Digital Circular Polarizer
- HR Digital UV Blocking Filter
- UV/IR Blocking Filter

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- **Skylight Filter**
- Filters for b&w photos

Filters for analog photography

Skylight Filter

A skylight filter for analog photography with reversal film has a very pale amber tint and acts like a UV filter to cut out ultraviolet radiation. In addition, it eliminates the bluish hue in the shadow due to the indirect light from the blue sky. This bluish color distortion is particularly unpleasant on skin. A skylight filter should only be used if the entire motif is in the shade. For the areas lit by direct sunlight will also be subject to the pink filter even though they do not have any bluish hue – they then turn pink. For this reason, a skylight filter should not be used for lens protection (use a neutral UV blocking filter instead).

When taking black & white photos, a skylight filter does not have a visible effect and is unnecessary.

For digital photography a skylight filter is also unnecessary because the automatic white balance corrects those bluish hues.

Filter type	Time	or	aperture correction
Skylight Filter 1A	1×		0 f-stops

Data sheets

- Filter order numbers for thread sizes up to E 58
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Skylight filter: for more natural colors in shadow areas which otherwise get a bluish hue from the blue sky

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Filters for analog and for digital photography

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- UV Blocking Filter
- Neutral Density Filters
- Skylight Filter
- **Filters for b&w photos**

Filters for analog and possibly digital photography

Color Filters for black & white film

These tinted glass filters in yellow, green, orange or red colors are used with b&w film to convert the filter color into lighter and its complementary color into darker gray tones. This may be to correct unfavorable tones or as a deliberate manipulation to obtain a more impressive representation. Although these filters are not intended for use with color film or digital photography, they may occasionally provide interesting effects.

A **green filter** makes greens lighter and reds (and to a lesser extent blue) darker so that they render leaves, for example, as lighter and red blossoms or tiled roofs as darker. This is often an advantage for landscapes or for close-ups of flowers or other plants. With tungsten light it provides more natural gray tones. A green filter also gives greater expression to portraits (but do not use if subject has skin blemishes, they would be enhanced) and provides the correct gamut conversion of the colors to gray under tungsten light with a high amber content.

A **yellow filter** is the most popular type of filter for b&w shots, particularly for landscape photography. It darkens a blue sky so that white clouds or snow in wintry landscapes appear with greater brilliance. As the effect of a bright yellow filter is very discreet, a medium to dark yellow filter is preferred.

An **orange filter** darkens blue even more than a yellow filter to create a very dramatic (cloud) atmosphere in landscape shots. With infrared b&w or color film, it is the most popular filter for magical effects especially in landscapes.

A **red filter** has an even more dramatic effect in landscape and architectural photos than yellow or orange filters. It is also ideal for "moonlight shots" during the day (underexpose slightly) and for spectacular photos with infrared color film.

Filter type	Time or	aperture correction
Green filter (13)	3×	1.6 f-stops
Yellowish green filter (11)	2×	1 f-stop
Medium yellow filter (8)	2.5× - 3×	1.3 - 1.5 f-stops
Dark yellow filter (15)	4×	2 f-stops
Orange filter (22)	4×	2 f-stops
Bright red filter (25)	8×	3 f-stops
Dark red filter (29)	8× - 12×	3 - 3.6 f-stops

Data sheets

- Filter order numbers for thread sizes up to E 58
- Filter oder numbers for thread sizes from E 60

Filter order numbers for sizes up to E 58

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Chart for sizes from E 60 on

To go back to the filter description, please click on the filter name below!

MC = Multi coated

Filter designation	Exposure factor	Filter type no.	M 27×0.5	M 28×0.75	M 30.5×0.5	M 30×0.75	M 37×0.75	M 39×0.5	M 40.5×0.5	M 43×0.75	M 46×0.75	M 49×0.75	M 52×0.75	M 55×0.75	M 58×0.75
Order number = Filter type no. completed with the 3 digit no.		Nominal size Outer Ø [mm]	E 27 29	E28 30	E30.5 32	E30 32	E37 39	E39 40.5	E40.5 42	E43 45	E46 48	E49 51	E52 54	E55 57	E58 60
							000 = Normal mount 000 = Slimline mount								
HR Circ. Polarizer MC	1 - 1.5	1095.0090.···	–	–	–	–	–	–	–	–	–	049	052	055	058
HR UV Blocking Filter MC	0	1095.0020.···	–	–	–	–	–	–	–	–	–	049	052	055	058
UV/IR Blocking Filter	0	1095.0031.···	**027**	**028**	**030**	–	**037**	–	**040**	**043**	**046**	**049**	**052**	**055**	**058**
Linear Polarizer	1 - 1.5	1095.0087.···	–	–	–	–	–	**039**	**040**	**043**	**046**	**049**	**052**	**055**	**058**
Circular Polarizer	1 - 1.5	1095.0088.···	**027**	**028**	**030**	**031**	**037**	039	040	043	046	049	052	055	058
Circular Polarizer MC	1 - 1.5	1095.0089.···	–	–	**030**	–	**037**	039	040	043	046	049	052	055	058
UV Blocking Filter	0	1095.0030.···	**027**	028	030	031	037	039	040	043	046	049	052	055	058
UV Blocking Filter MC	0	1095.0032.···	–	–	030	–	037	039	040	043	046	049	052	055	058
ND Filter 2×	1	1095.2030.···	–	–	–	–	–	–	–	–	–	049	052	055	058
ND Filter 4×	2	1095.2060.···	–	–	–	–	–	–	–	–	–	049	052	055	058
ND Filter 8×	3	1095.2090.···	–	–	–	–	–	–	–	–	–	049	052	055	058
Skylight Filter	0	1095.0040.···	**027**	028	030	031	037	039	040	043	046	049	052	055	058
Skylight Filter MC	0	1095.0039.···	–	–	030	031	037	039	040	043	046	049	052	055	058
Green (13)	1.6	1095.1013.···	**027**	028	030	–	037	039	040	043	046	049	052	055	058
Yellowish green (11)	1	1095.1011.···	**027**	028	030	–	037	039	040	043	046	049	052	055	058
Medium yellow (8)	1.3 - 1.5	1095.1008.···	**027**	028	030	–	037	039	040	043	046	049	052	055	058
Dark yellow (15)	2	1095.1015.···	**027**	028	030	–	037	039	040	043	046	049	052	055	058
Orange (22)	2	1095.1022.···	**027**	028	030	–	037	039	040	043	046	049	052	055	058
Bright red (25)	3	1095.1025.···	**027**	028	030	–	037	039	040	043	046	049	052	055	058
Dark red (29)	3 - 3.6	1095.1029.···	**027**	028	030	–	037	039	040	043	046	049	052	055	058

Filter order numbers for sizes from E60 on

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Chart for sizes up to E58

To go back to the filter description, please click on the filter name below!

MC = multi-coated

Order number = Filter type no. completed with the 3 digit no.	Nominal size Outer Ø [mm]	M 60×0.75 E60 62	M 62×0.75 E62 65	M 67×0.75 E67 70	M 72×0.75 E72 75	M 77×0.75 E77 80	M 82×1 E82 85	M 86×1 E86 90	M 95×1 E95 100	M 100×1 E100 103	M 105×1 E105 110	M 112×1.5 E112 115	M 127×1 E127 132
Filter designation	Exposure factor	Filter type no.	**000** = Normal mount 000 = Slimline mount										
HR Circ. Polarizer MC	1 - 1.5	1095.0090.···	–	062	067	072	077	082	086	095	–	–	–	–
HR UV Blocking Filter MC	0	1095.0020.···	–	062	067	072	077	082	086	095	–	–	–	–
UV/IR Blocking Filter	0	1095.0031.···	–	**062**	**067**	**072**	**077**	**082**	–	–	–	–	–	–
Linear Polarizer	1 - 1.5	1095.0087.···	**060**	**062**	**067**	**072**	**077**	**082**	**086**	–	–	–	–	–
Circular Polarizer	1 - 1.5	1095.0088.···	060	062	067	072	077	082	086	–	–	–	–	–
Circular Polarizer MC	1 - 1.5	1095.0089.···	060	062	067	072	077	082	086	**095**	–	**105**	–	–
UV Blocking Filter	0	1095.0030.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
UV Blocking Filter MC	0	1095.0032.···	060	062	067	072	077	082	086	095	–	105	–	–
ND Filter 2×	1	1095.2030.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
ND Filter 4×	2	1095.2060.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
ND Filter 8×	3	1095.2090.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
Skylight Filter	0	1095.0040.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
Skylight Filter MC	0	1095.0039.···	060	062	067	072	077	082	086	095	–	105	–	–
Green (13)	1.6	1095.1013.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
Yellowish green (11)	1	1095.1011.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
Medium yellow (8)	1.3 - 1.5	1095.1008.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
Dark yellow (15)	2	1095.1015.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
Orange (22)	2	1095.1022.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
Bright red (25)	3	1095.1025.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**
Dark red (29)	3 - 3.6	1095.1029.···	060	062	067	072	077	082	086	095	**100**	105	**112**	**127**

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Aspherical Magnifiers

All aspherical Rodenstock magnifiers excel by highest optical performance, provide a comfortable, fatigue-free view even for eyeglass wearers and during long-term observation. They provide a stable image, too, even if the eye does not rest in a fixed position above the eyepiece. They are convincing by a noble design without frills and with very practical details.

Their multi-element optical design is optimized for the special demands of visual usage and comprises different glass types for eliminating color fringes as well as aspherical lens surfaces for achieving uniform sharpness up to the margin, freedom from distortion and good flatness of field. So these magnifiers are real precision instruments of an extraordinary quality level.

Multicoating enhances light transmission for a bright and brilliant image and eliminates contrast-reducing flare and reflections. An efficient reflection reducing coating is important because magnifiers are often used (or mostly by photographers) for evaluating transparencies or negatives on a light table. In this application the extremely bright back light could generate nebulous flare, irritating reflections and ghost images.

All three magnifiers can be adapted to frontal illuminated or backlit subjects: The magnifier 3× has a half black and half transparent base that can be turned, and both magnifiers 4× and 6× have a sliding skirt that shades frontal light in its lower position for viewing transparancies and allows diffused light to fall through a translucent tube in its upper position for viewing opaque subjects in almost shadow-free illumination.

All magnifiers can be adjusted for diopter compensation. Eyeglass wearers can fold down the rubber eyecups; eyeglasses cannot be scratched. The very long eye relief, a large lens and exit pupil diameter provide a very comfortable viewing, allow the eye to move without cropping the large field of view.

With the detachable neck strap the magnifiers can be taken permanently, will be available and can be used instantly whenever they are needed, e.g. in a graphics studio or photo studio.

Aspherical magnifier	Field of view	Diopter adjustm.
Aspherical magnifier 3×	60 × 60 mm	±0 … –1.5 D
Aspherical magnifier 4×	41 mm Ø	+0.5 … –2.5 D
Aspherical magnifier 6×	57 mm Ø	+1 … –2.0 D

Data sheet

Technical specifications

Aspherical magnifiers: render the finest details crisp and without distortion in a very wide field of view

Aspherical Magnifiers

Back to description

Technical specifications

Aspherical Magnifier	Elements/ groups	Diopter adjustment	Field of view	Eyepiece passage	Exit pupil	Eye relief	Dimensions[1] width × height	Weight
Magnifier 3×	2 / 1	±0 … -1,5 D	60 × 60 mm	36 mm Ø	16 mm Ø	30 mm	81 × 104 mm	210 g
Magnifier 4×	2 / 1	+0.5 … -2,5 D	41 mm Ø	28 mm Ø	16 mm Ø	30 mm	53 × 65 mm	80 g
Magnifier 6×	3 / 2	+1 … -2,0 D	57 mm Ø	46 mm Ø	12 mm Ø	32 mm	68 × 63 mm	210 g

[1]) The height of the magnifiers is given for a diopter correction setting of 0 D and folded eyecup