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Photo Optics / Digital Photography

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

- 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
- Professional digital photography with high-resolution CCD line scanner backs and CCD/CMOS chip backs
- 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 and negatives 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. The last link in the left column allows you to jump to an address list with our LINOS distributors in Germany as well as in many other countries in Europe and overseas.



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Lenses for Analog Professional Photography

Even in the age of digital photography, the professional camera remains the dominant tool for advertising, still-life and architectural photographs. The large formats of conventional photography still offer unsurpassed 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 – 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 met by the Apo-Sironar available in the two versions "N" and "S". As a standard lens, it is used with a focal length which roughly corresponds to the diagonal of the format.
- 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

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Lenses for Analog Professional Photography

Apo-Sironar-N

The Apo-Sironar-N is the all-round lens for the professional photographer. Typical applications are product shots of every kind, industrial subjects, landscape and city photography.

The Apo-Sironar-N equally provides an ideal longer focus lens with smaller formats. Monorail view cameras permit almost unlimited extension (especially with extension bellows). As a result optically problematic tele lens designs whose Barlow group tends to produce color fringes are no longer needed; their short back focal length only provides advantages for cameras without a bellows for focusing.

The six-element Apo-Sironar-N bears the "Apo" designation without restriction despite its very advantageous price. The field angle is 72°. The image circle diameter exceeds the diagonal of the recommended format by around 45 %; this gives the photographer considerable edge quality together with abundant shift and swing or tilt possibilities.



Data sheets

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Apo-Sironar-N	Max. recommended film format
150 mm f/5.6	9×12 cm / 4×5 in.
210 mm f/5.6	13×18 cm / 5×7 in.

**Apo-Sironar-N: world famous as
the photographer's powerfull "work horse"**

Apo-Sironar-N

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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
150 mm f/5.6	9×12 cm / 4×5 in.	0	51 mm	M 49 × 0.75	42.0 mm	142.0 mm	51.0 mm	220 g
210 mm f/5.6	13×18 cm / 5×7 in.	1	70 mm	M 67 × 0.75	60.0 mm	200.0 mm	66.0 mm	440 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

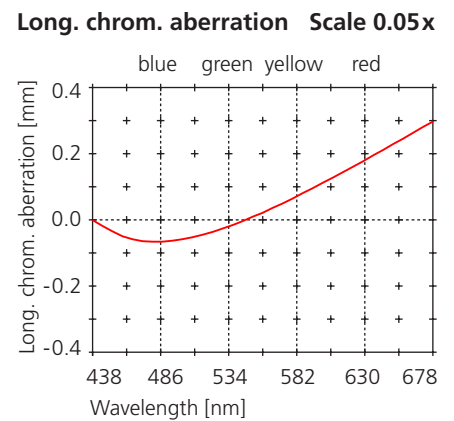
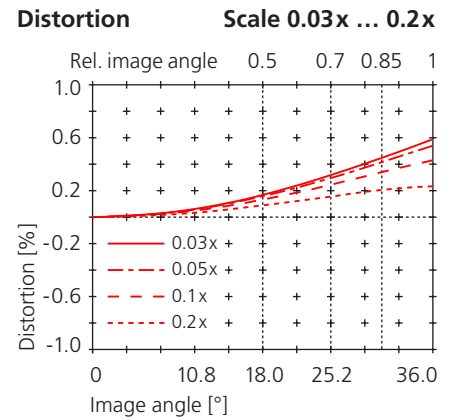
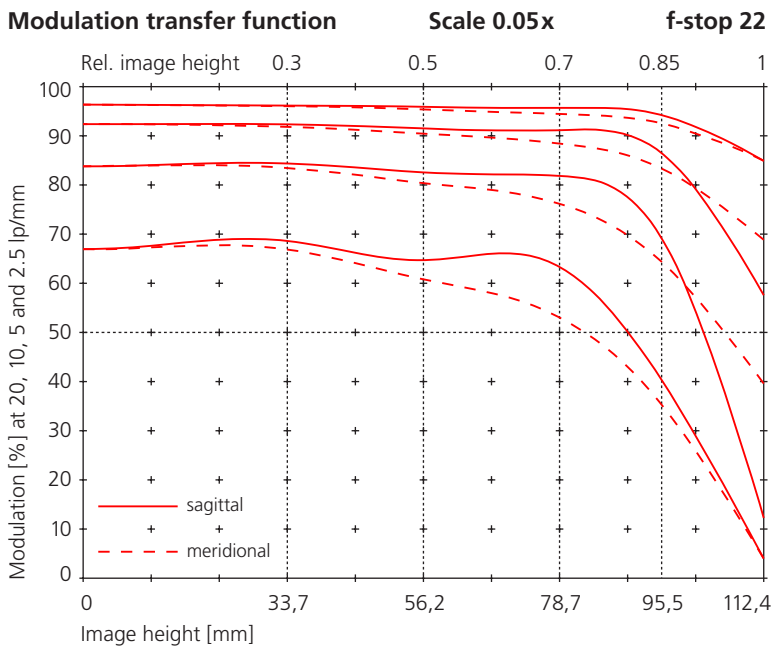
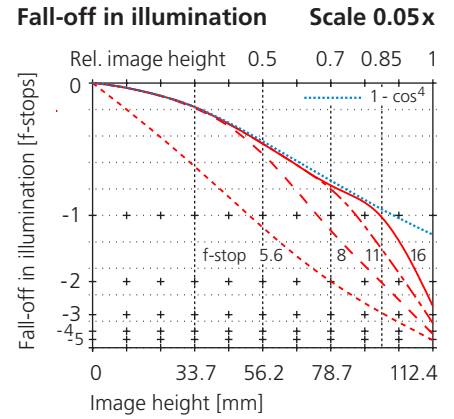
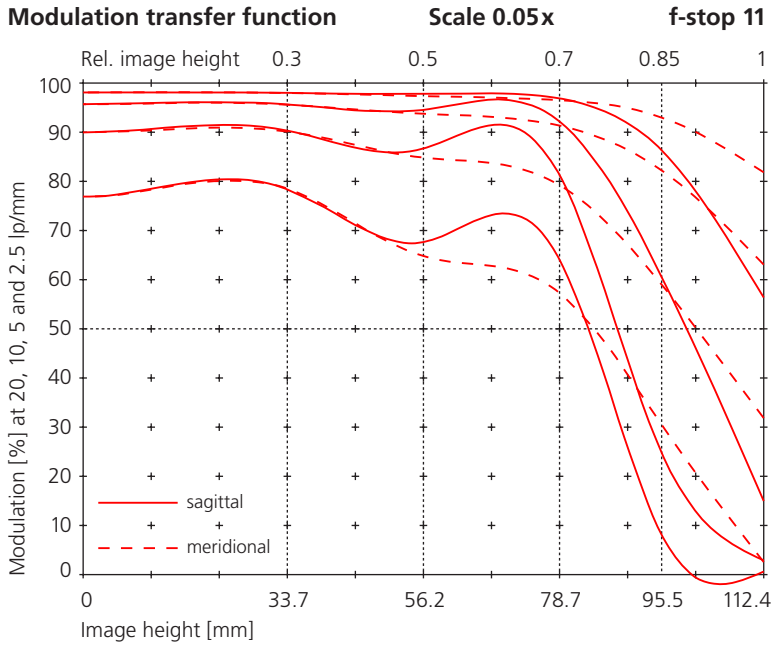
Working apertures, image angles, image circles and movement ranges

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.
150 mm f/5.6	1:∞	16-22	75°	231 mm	73 / 69	69 / 59	63 / 46	40 / 36	4 / 3	
210 mm f/5.6	1:∞	22-32	75°	316 mm	119 / 114	116 / 104	111 / 91	90 / 83	64 / 53	

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

Apo-Sironar-N 150 mm f/5.6

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

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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 f-stop 16 as its working aperture – a special advantage for outdoor shots due to the shorter exposure time this allows.



Data sheets

- ▶ [Formats, dimensions, shutter data, image circles, movement ranges](#)
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Apo-Sironar-S	Max. recommended film format
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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.

**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

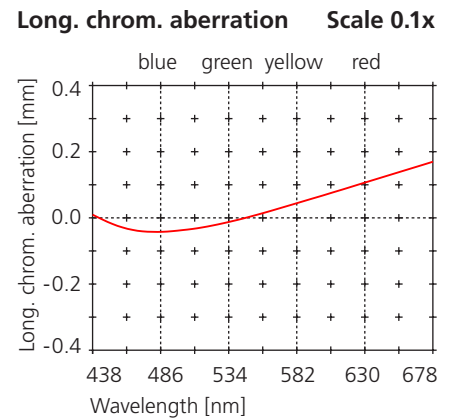
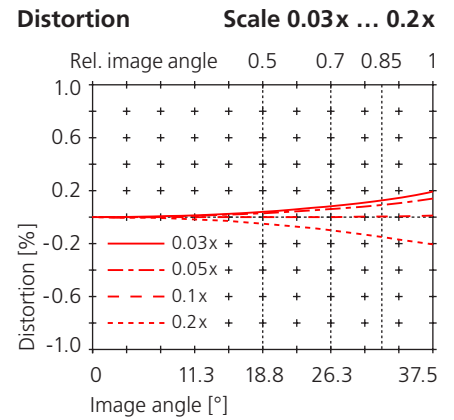
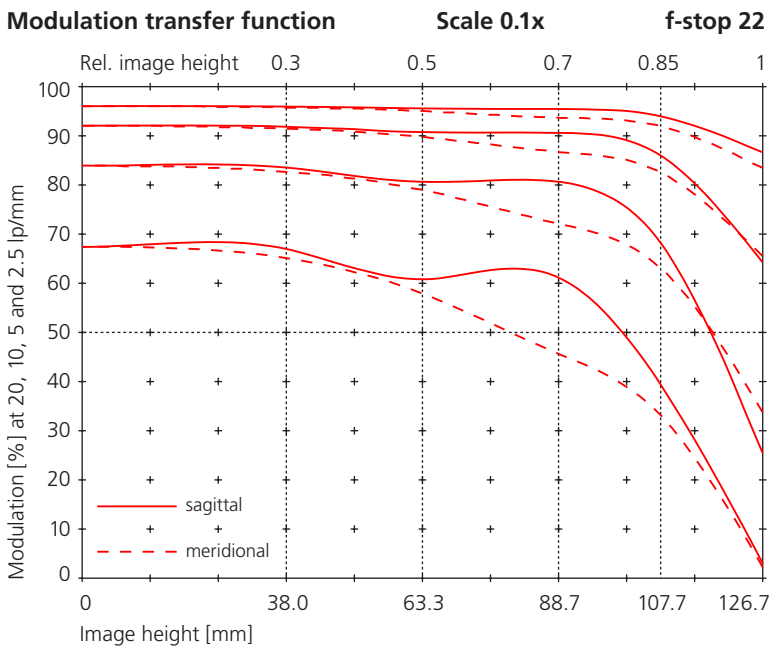
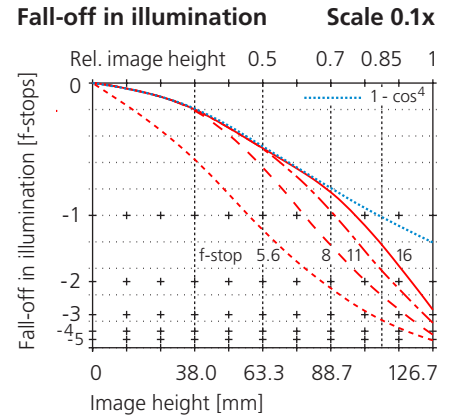
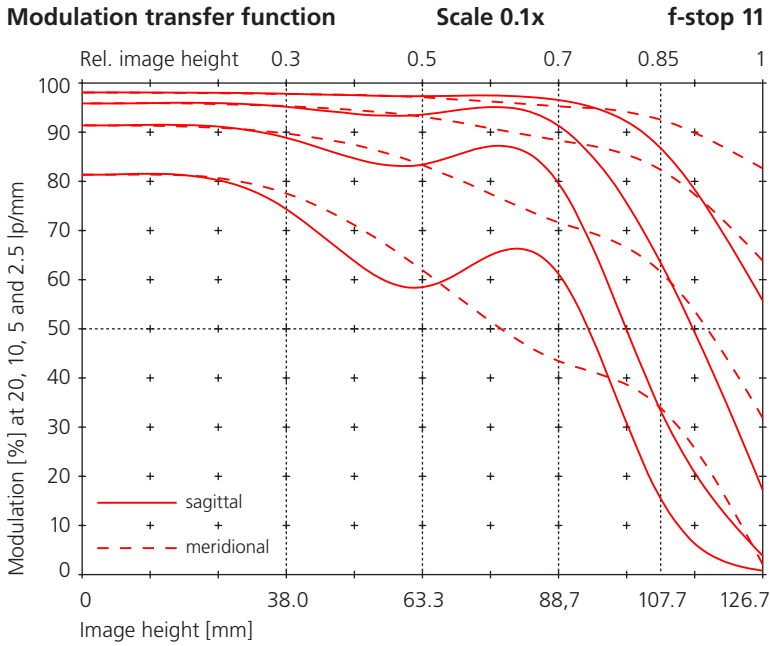
Working apertures, image angles, image circles and movement ranges

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

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

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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-N lenses come into their 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, 1:3 at a film size of 13×18 cm means the full format image reproduction of an object of approximately 40×50 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 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. The focal lengths of 120 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

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

Apo-Macro-Sironar

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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

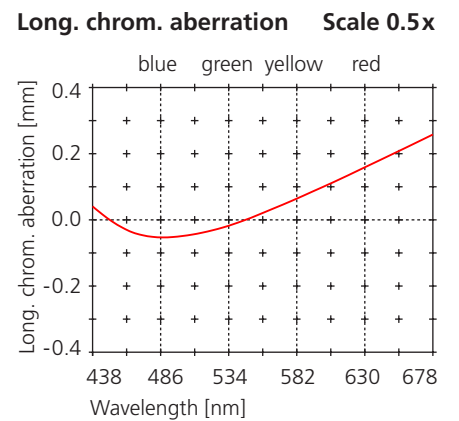
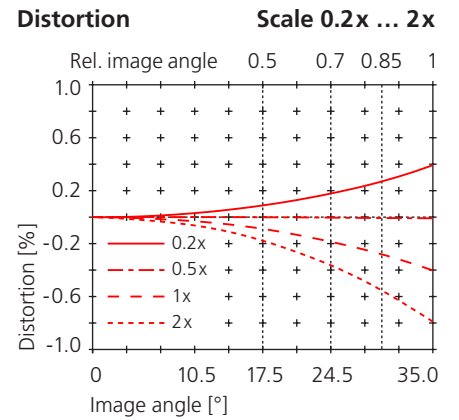
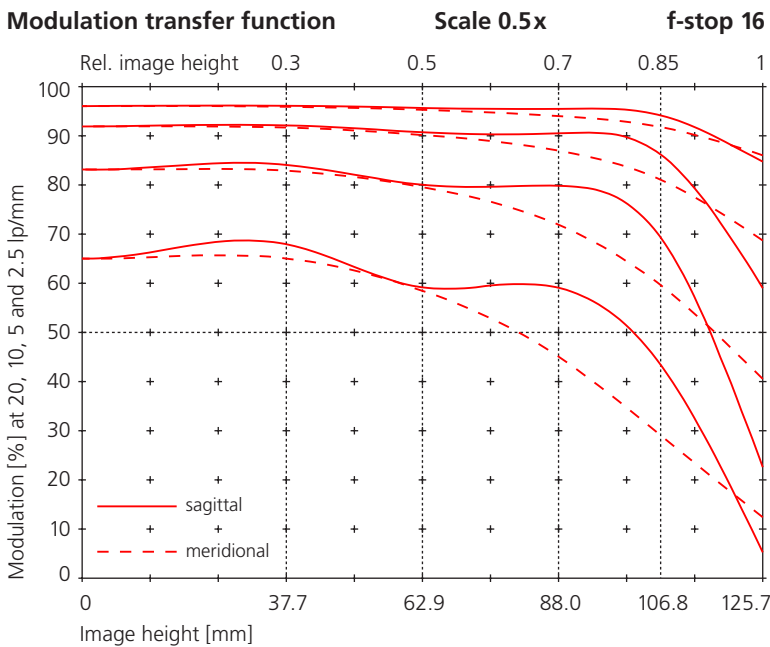
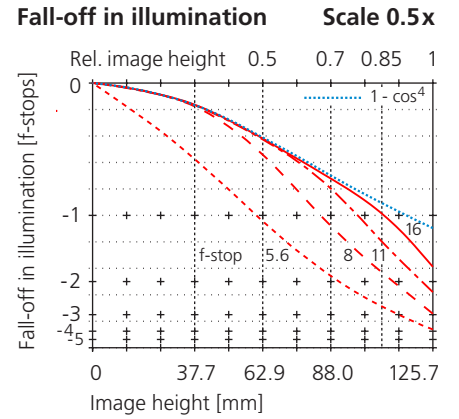
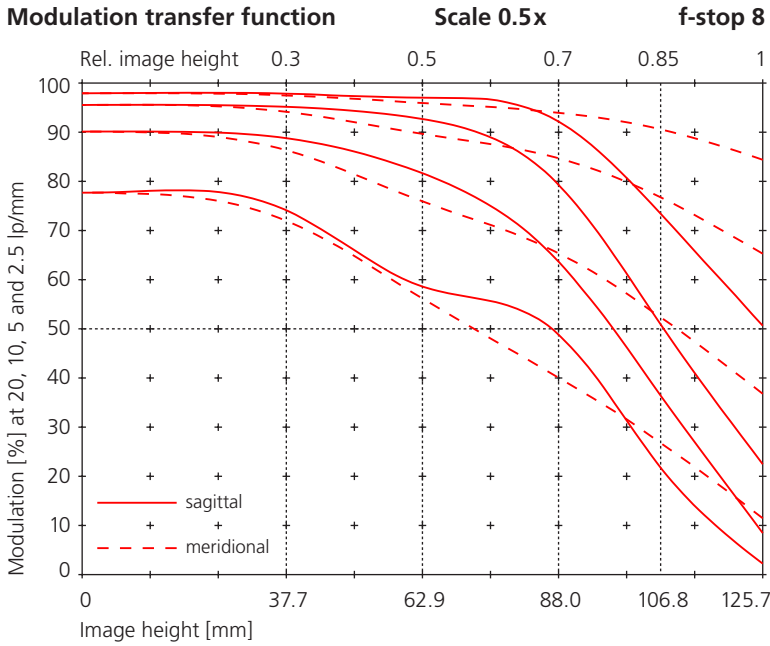
Working apertures, image angles, image circles and movement ranges

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

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All spatial frequencies [line pairs/mm],
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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-Grandagon 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" 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 "cos⁴ 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

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Apo-Grandagon: freedom for architecture, landscape and studio

Apo-Grandagon

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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

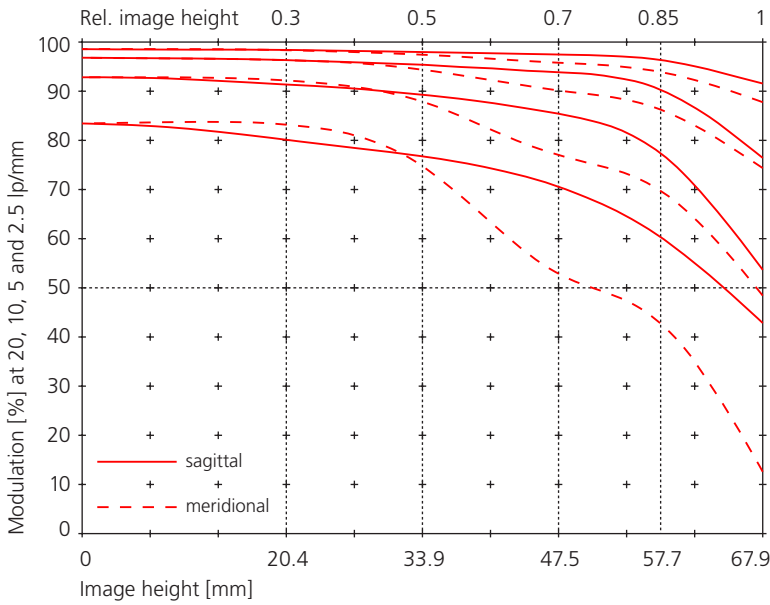
Lens	Image scale	Working f-stop	Image angle	Image circle diameter	Movement range [mm] 2) vertical/horizontal (landscape format)					
					6×7 cm	6×9 cm	6×12 cm	4×5 in.	5×7 in.	8×10 in.
35 mm f/4.5	1:∞	8-11	120°	125 mm	24 / 22	16 / 12				
45 mm f/4.5	1:∞	8-11	110°	131 mm	28 / 25	20 / 15	4 / 2			
55 mm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

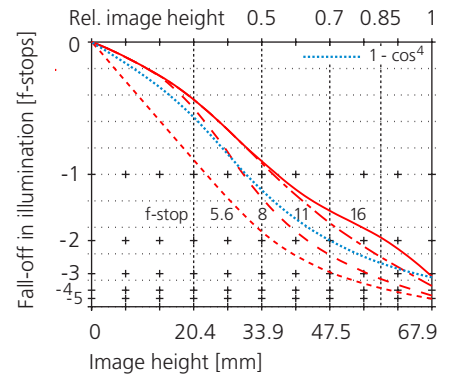
Apo-Grandagon 45 mm f/4.5

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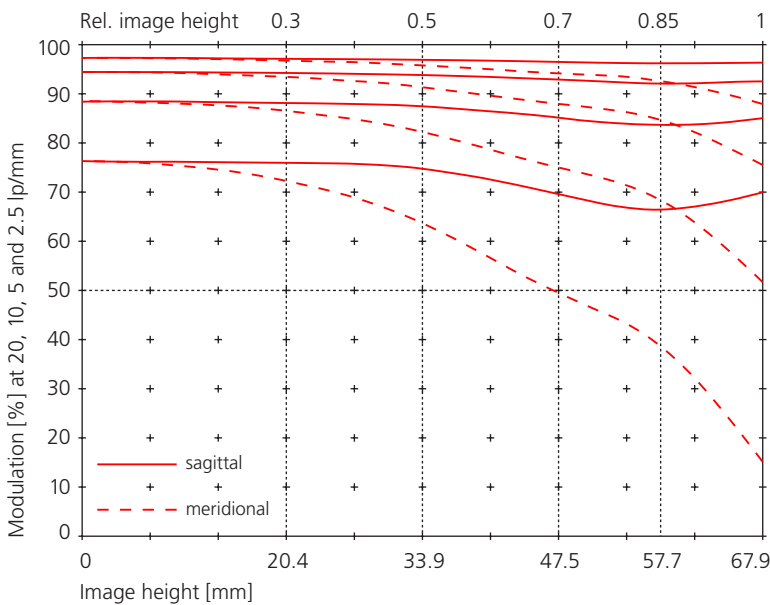
Modulation transfer function Scale 0.03x f-stop 8



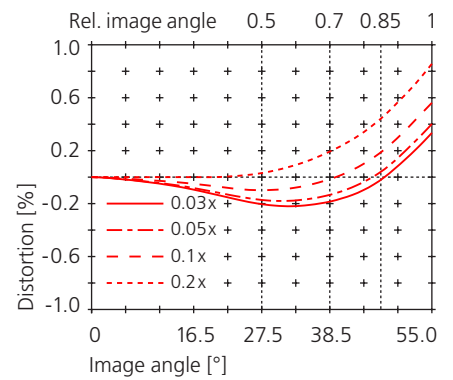
Fall-off in illumination Scale 0.03x



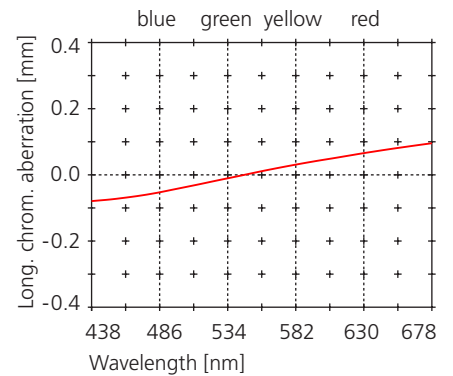
Modulation transfer function Scale 0.03x f-stop 16



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**

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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 bellows 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 1](#)
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**Grandagon-N: the "space expander"
for situations where space is limited**

Grandagon-N

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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

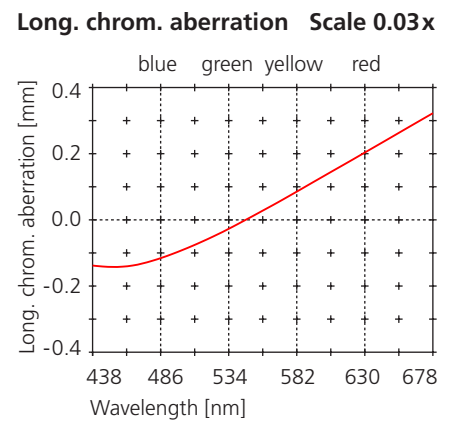
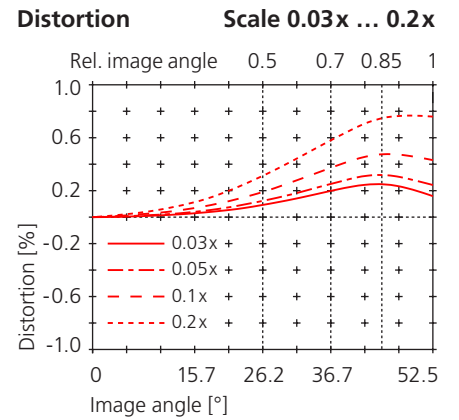
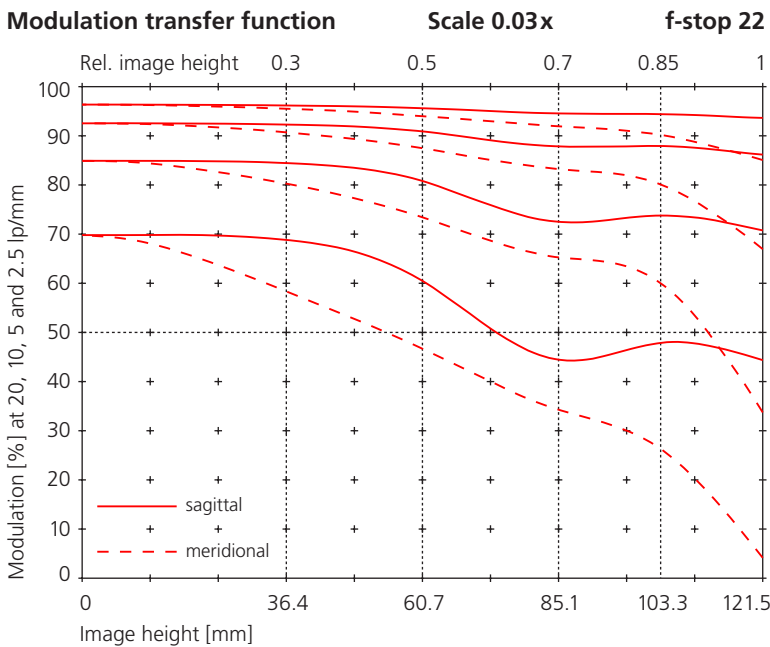
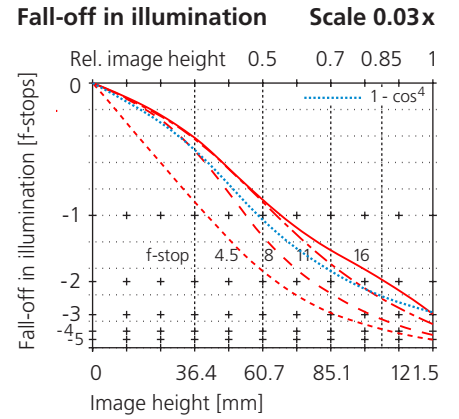
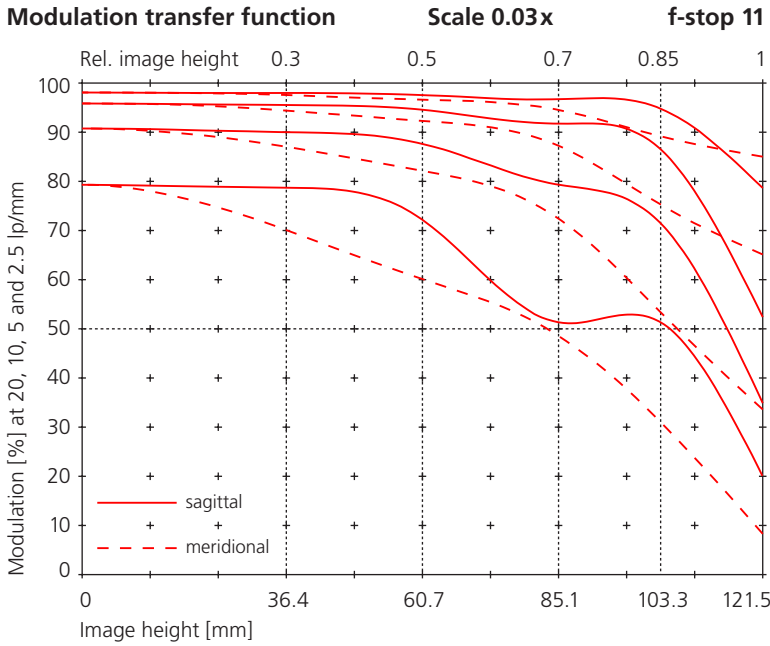
Working apertures, image angles, image circles and movement ranges

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

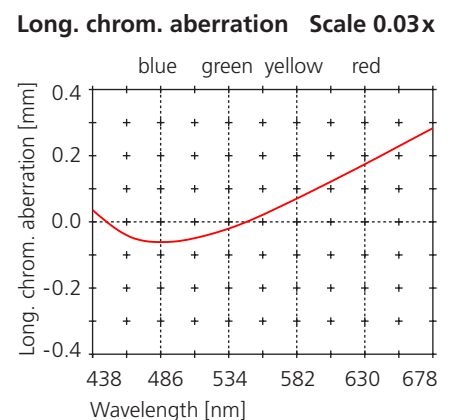
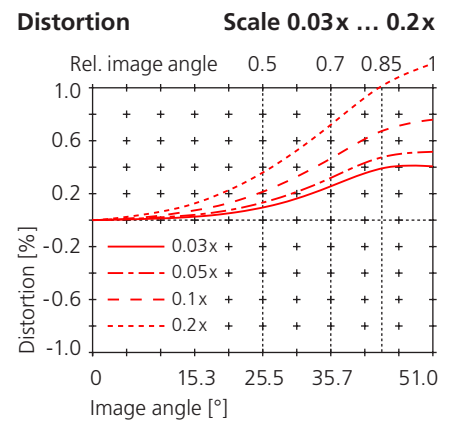
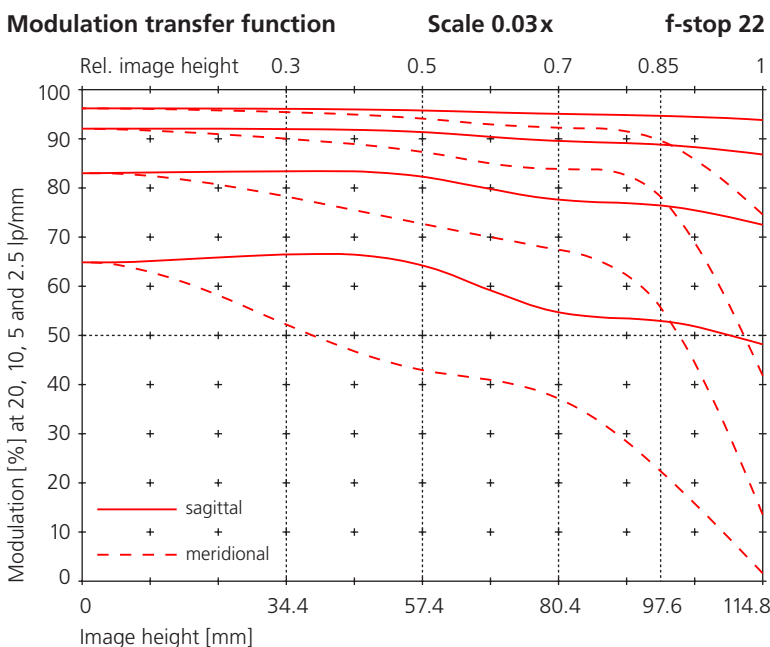
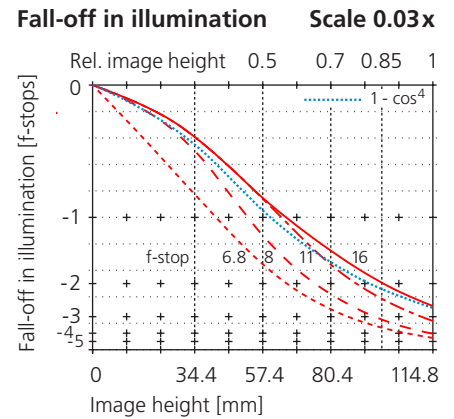
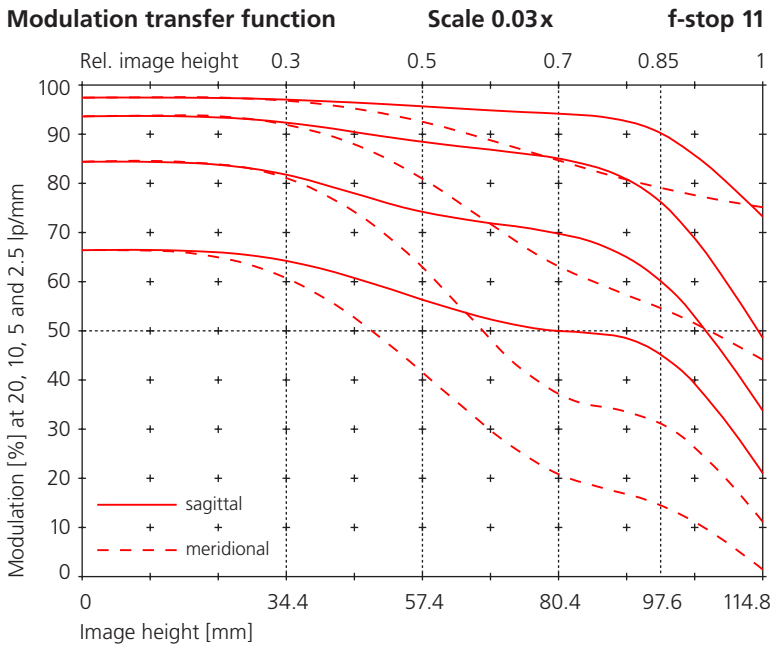
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**All spatial frequencies [line pairs/mm],
image heights [mm] and scales
are related to the film or sensor side**

Grandagon-N 90 mm f/6.8

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

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- ▶ **Accessories: Center filters**
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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 "cos⁴ 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 5x
45 mm f/4.5	E 67/86	+2.5 5x
55 mm f/4.5	E 67/86	+2.5 5x
65 mm f/4.5	E 58/77	+1.5 3x
75 mm f/6.8	E 58/77	+1.5 3x
75 mm f/4.5	E 67/86	+1.5 3x
90 mm f/6.8	E 67/86	+1.5 3x
90 mm f/4.5	E 82/112	+1.5 3x
115 mm f/6.8 *	E 82/112	+1.5 3x

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

**Centerfilter: for even illumination
with ultra-wide angle large format lenses**

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- ▶ [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

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- ▶ [Apo-Sironar digital HR](#)

Lenses for Digital Professional Photography

Digital photography may be superior to conventional photography if the end-product is a printed image: digital photography is faster, cheaper for high photo quantities, it makes re-touching easier, allows more effective manipulation and often has a higher quality. However, it makes much higher demands on the image reproduction 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 high apertures (f-stop 8 to 11, when used with the 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 Apo-Sironar digital, the Apo-Macro-Sironar digital and the Apo-Sironar digital HR lenses.

- Both lens series Apo-Sironar digital and Apo-Macro-Sironar digital (the latter is optimized for large scales) provide large image circles for use with digital scan backs as well as with chip backs having larger area sensors or 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. So they allow substantial camera movements. Resolving power is designed for pixel grid widths down to 9 μm .
- The Apo-Sironar digital HR 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 with pixel grid widths below 12 μm down to 5 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**

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Lenses for Digital Professional Photography

Apo-Sironar digital / Apo-Macro-Sironar digital

This line of Rodenstock lenses provides the photographer with an exhaustive spectrum of focal lengths for digital shots in the very highest imaging quality with adjustable professional cameras. The fine gradation of focal lengths meets the demands of every motif and all chip or scan back formats. Focal lengths from 35 mm mean that real wide-angle shots are possible, even with the smaller area sensor sizes, while still allowing large movements. All Apo-Sironar digital lenses are characterized by excellent sharpness and brilliance together with total freedom from color fringes in real apo quality.

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
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35 mm f/4.5	46×58 mm
45 mm f/4.5	72×96 mm
55 mm f/4.5	72×96 mm
90 mm f/5.6	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	
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120 mm f/5.6	72×96 mm
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Data sheets

- ▶ [Formats, dimensions, shutter data, image circles, movement ranges](#)
- ▶ [Performance data 1](#)
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**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

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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
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
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

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

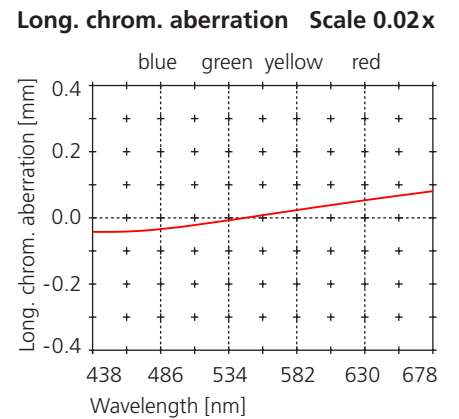
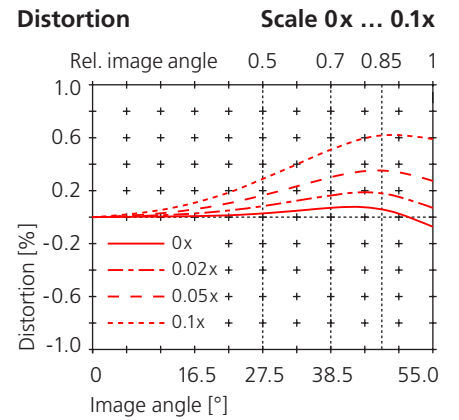
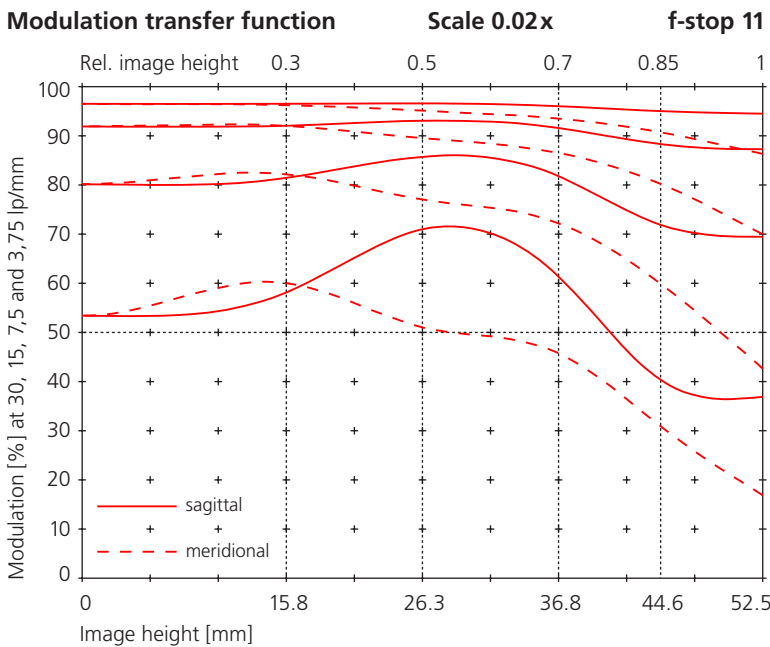
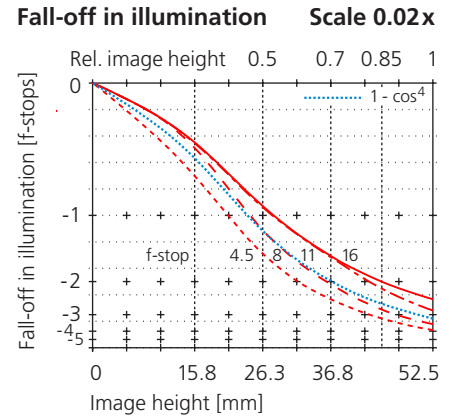
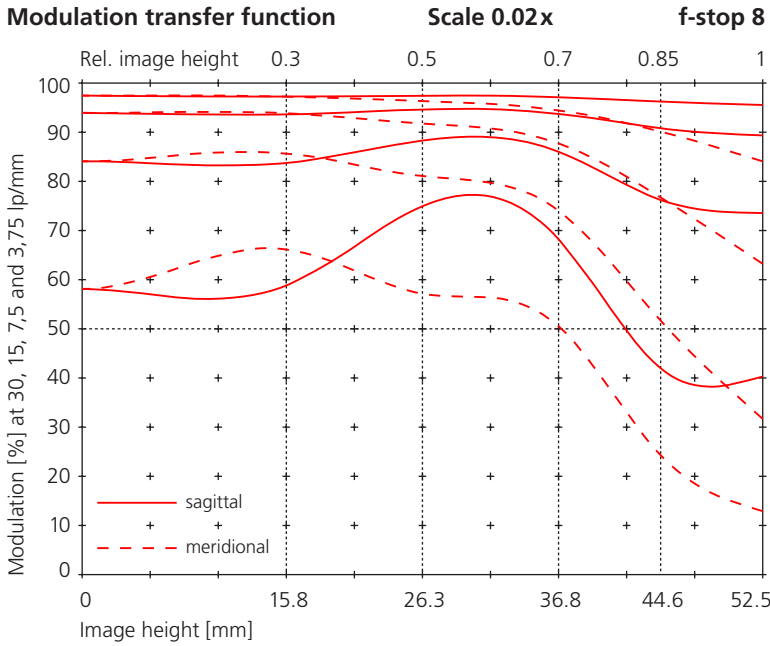
Working apertures, image angles, image circles and movement ranges

Lens	Image scale	Working f-stop	Image angle	Image circle diameter	Movement range [mm] ²⁾ vertical/horizontal (landscape format)					
					24×36 mm	37×37 mm	37×49 mm	46×58 mm	72×88 mm	72×96 mm
35 mm f/4.5	1:∞	8-11	111°	105 mm	37 / 33	31 / 31	29 / 25	21 / 18		
45 mm f/4.5	1:∞	8-11	107°	125 mm	48 / 43	41 / 41	40 / 36	32 / 29	8 / 7	4 / 3
55 mm f/4.5	1:∞	8-11	95°	125 mm	48 / 43	41 / 41	40 / 36	32 / 29	8 / 7	4 / 3
90 mm f/5.6	1:∞	8-11	70°	125 mm	48 / 43	41 / 41	40 / 36	32 / 29	8 / 7	4 / 3
105 mm f/5.6	1:∞	8-11	62°	125 mm	48 / 43	41 / 41	40 / 36	32 / 29	8 / 7	4 / 3
135 mm f/5.6	1:∞	8-11	58°	150 mm	61 / 56	54 / 54	53 / 49	46 / 42	25 / 22	21 / 18
150 mm f/5.6	1:∞	8-11	53°	150 mm	61 / 56	54 / 54	53 / 49	46 / 42	25 / 22	21 / 18
180 mm f/5.6	1:∞	8-11	45°	150 mm	61 / 56	54 / 54	53 / 49	46 / 42	25 / 22	21 / 18
120 mm f/5.6	1:5 - 2:1	8-11	55° - 24°	150 mm	61 / 56	54 / 54	53 / 49	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

Apo-Sironar digital 35 mm f/4.5

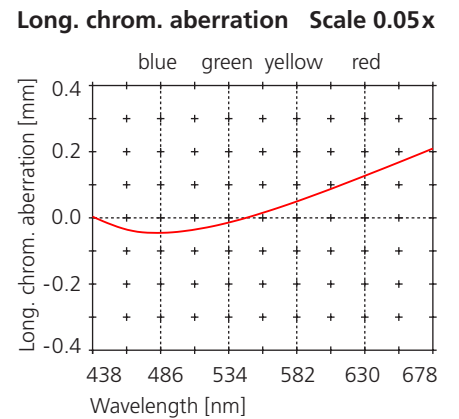
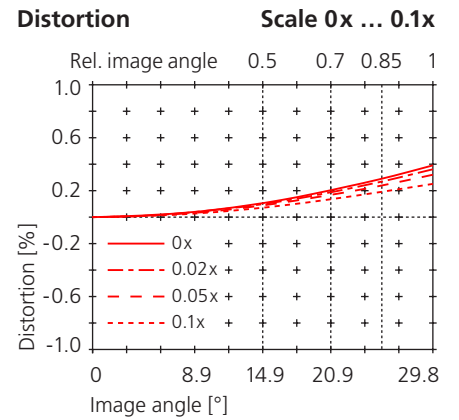
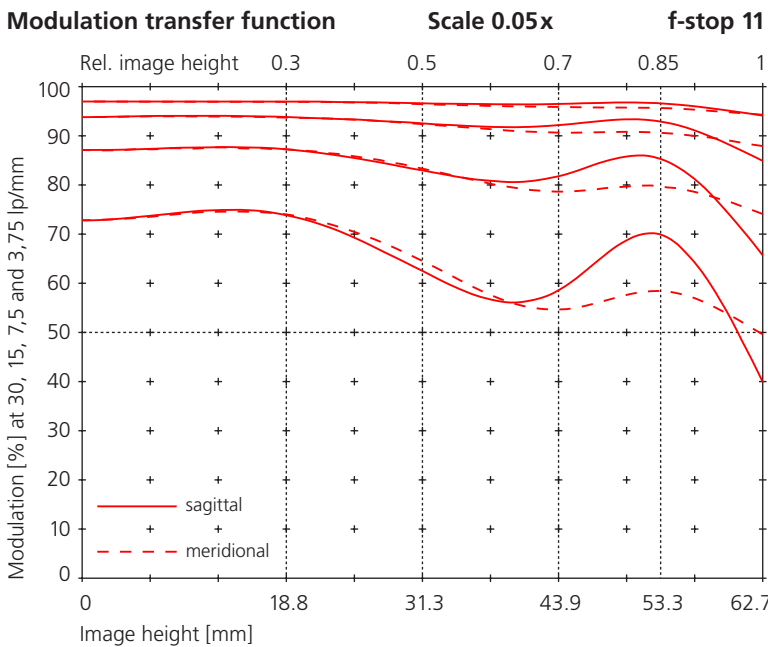
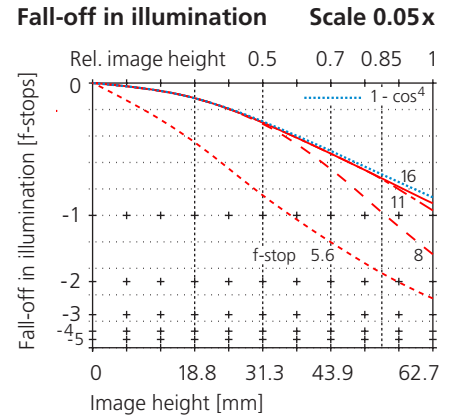
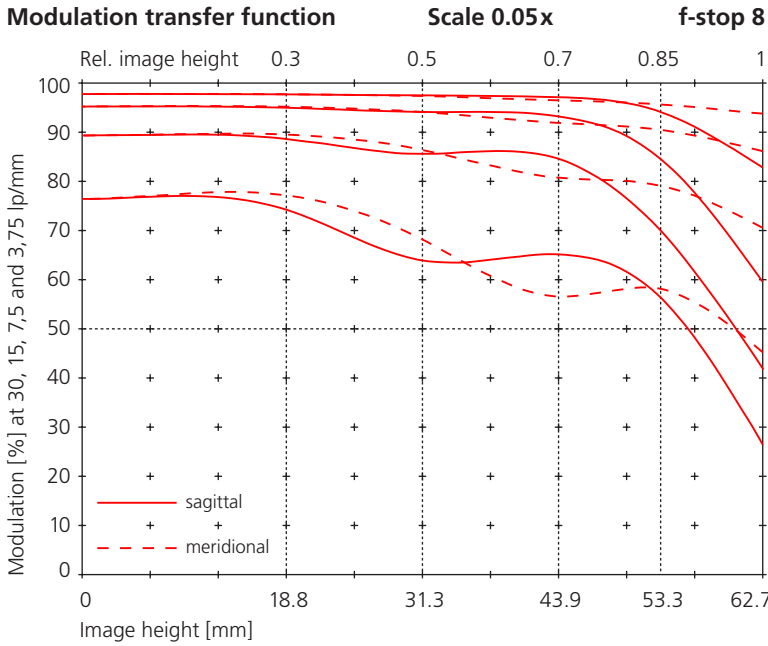
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All spatial frequencies [line pairs/mm],
image heights [mm] and scales
are related to the film or sensor side

Apo-Sironar digital 105 mm f/5.6

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

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Lenses for Digital Professional Photography

Apo-Sironar digital HR

The Rodenstock Apo-Sironar digital HR lens series was developed for special applications with extremely high resolution CCD chip backs with pixel sizes even smaller than 10 μm such as can only be realized with smaller digital camera formats. These lenses utilize every technological possibility to get as close as possible to the absolute 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 a one-shot back used or due to interpolation.

The resolving power of the Apo-Sironar digital HR 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 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 also reduce color noise in the shadows.

Apo-Sironar digital HR	Max. recommended format
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35 mm f/4	37×49 mm
60 mm f/4	37×49 mm
100 mm f/4	37×49 mm



Data sheets

- ▶ [Formats, dimensions, shutter data, image circles, movement ranges](#)
- ▶ [Performance data 1](#)
- ▶ [Performance data 2](#)

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

Apo-Sironar digital HR

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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	37×49 mm	0	70 mm	M 67 × 0.75	48.0 mm	53.0 mm	29.2 mm	80.4 mm	480 g
60 mm f/4	37×49 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	37×49 mm	0	60 mm	M 58 × 0.75	42.0 mm	99.4 mm	73.4 mm	22.1 mm	370 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

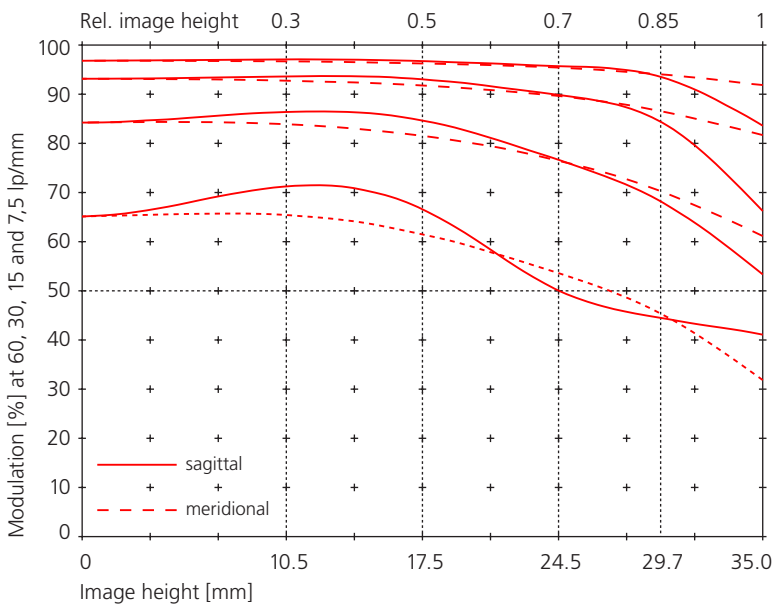
Lens	Image scale	Working f-stop	Image angle	Image circle diameter	Movement range [mm] ²⁾ vertical/horizontal (landscape format)					
					24×36 mm	37×37 mm	37×49 mm	46×58 mm	72×88 mm	72×96 mm
35 mm f/4	1:∞	5.6-8	90°	70 mm	18 / 15	11 / 11	6 / 5			
60 mm f/4	1:∞	5.6-8	60°	70 mm	18 / 15	11 / 11	6 / 5			
100 mm f/4	1:∞	5.6-8	39°	70 mm	18 / 15	11 / 11	6 / 5			

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

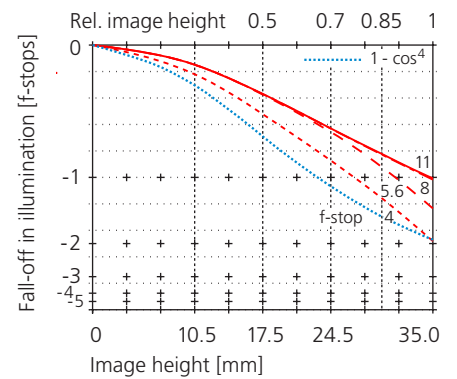
Apo-Sironar digital HR 35 mm f/4

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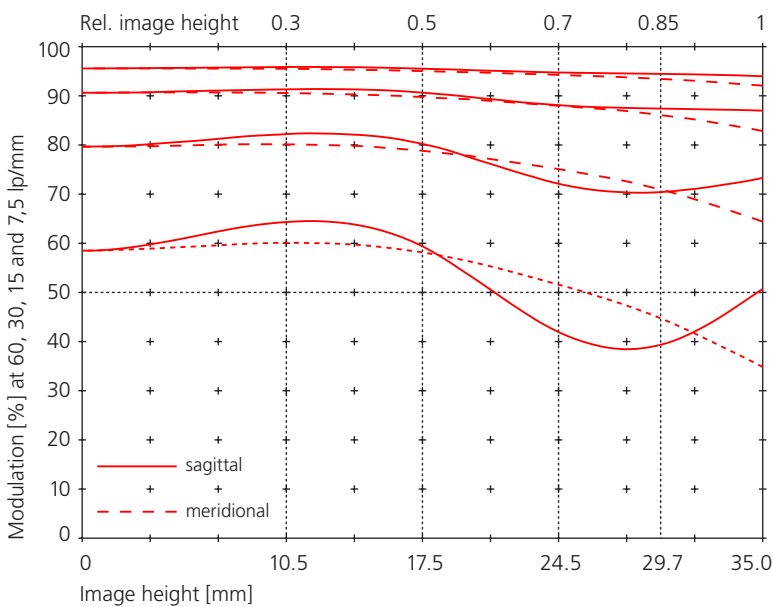
Modulation transfer function Scale 0.02x f-stop 5.6



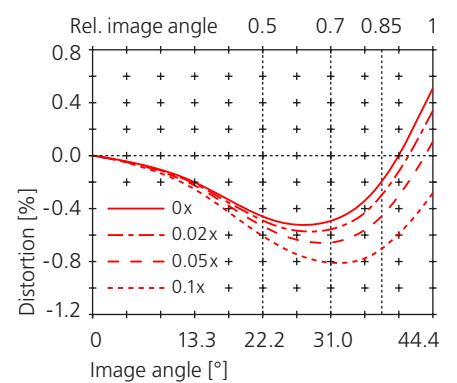
Fall-off in illumination Scale 0.02x



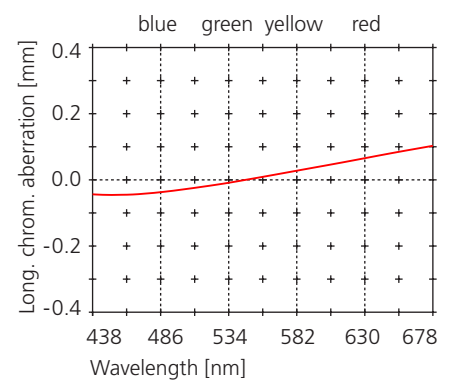
Modulation transfer function Scale 0.02x f-stop 8



Distortion Scale 0x ... 0.1x



Long. chrom. aberration Scale 0.02x

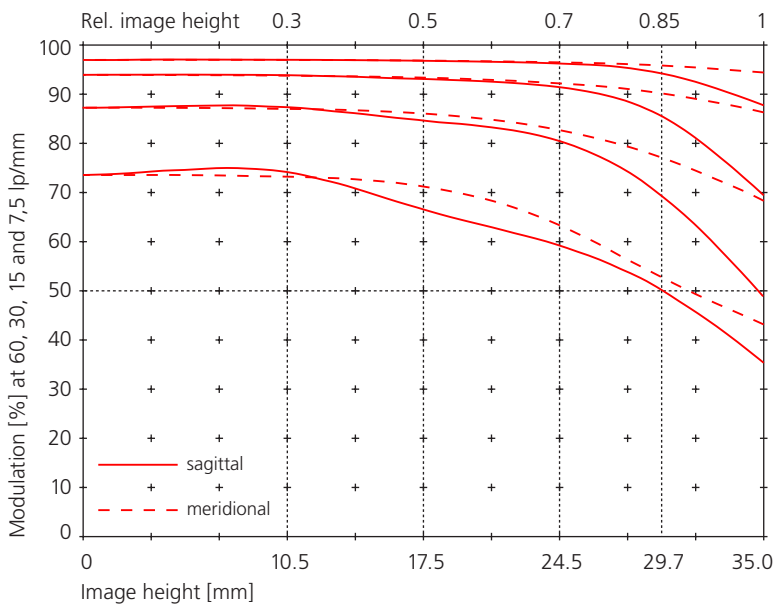


All spatial frequencies [line pairs/mm],
image heights [mm] and scales
are related to the film or sensor side

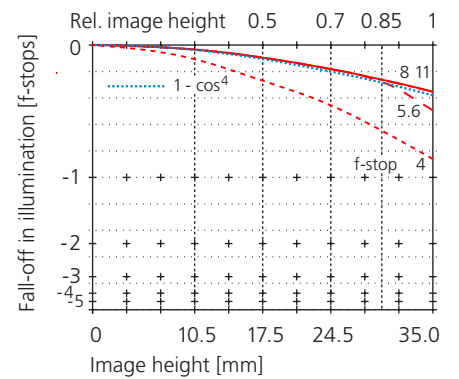
Apo-Sironar digital HR 100 mm f/4

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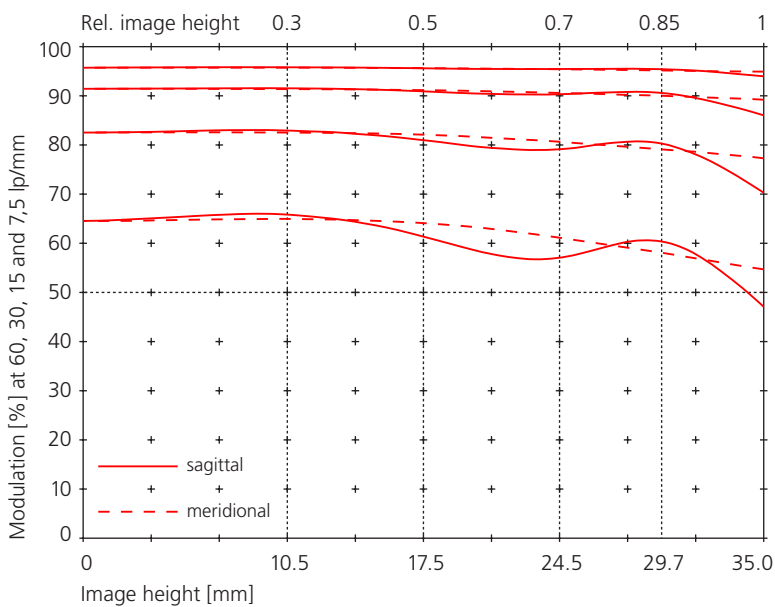
Modulation transfer function Scale 0.05x f-stop 5.6



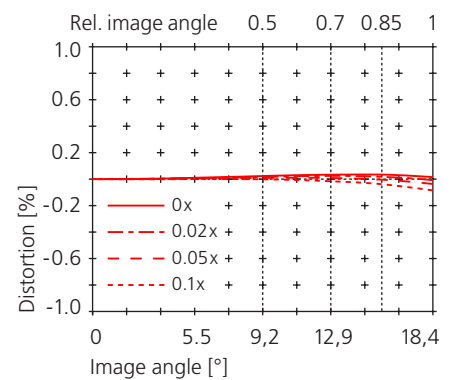
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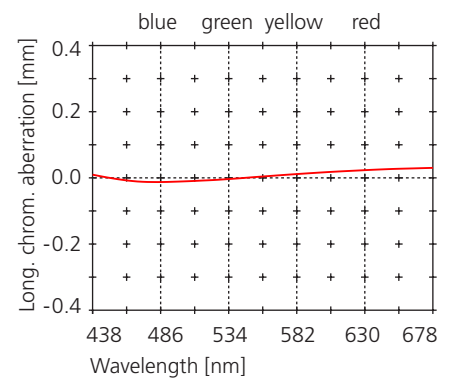
Modulation transfer function Scale 0.05x f-stop 8



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

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- ▶ [Accessories: Modular-Focus](#)

Lenses for Enlarging, CCD Photos and Video

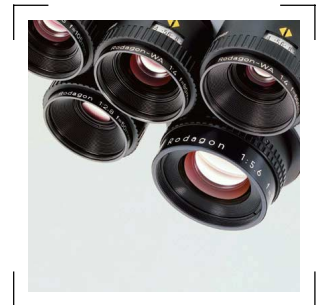
To reproduce a photograph as a picture on paper requires two optical imaging processes: One to put the image onto the film and one to enlarge the image onto the paper. The second image reproduction process is no less important for the quality of the final result than the first. When selecting your enlarging 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 product range 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 8 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 8×10 in./24×30 cm 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 second imaging process from the negative or transparency to the print no detail will be lost that has been captured in the first imaging process by your high-quality camera lens

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▶ **Rogonar**

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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 2x to 8x 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.



Data sheets

▶ [Formats, dimensions, recommended scales, features](#)

▶ [Performance data](#)

Rogonar	Recommended scale range	Maximum film format
50 mm f/2.8	2x - 8x	24x36 mm

**Rogonar: the low-priced starter
for the amateur darkroom**

Rogonar

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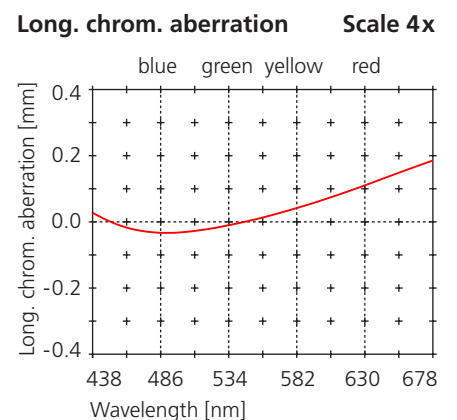
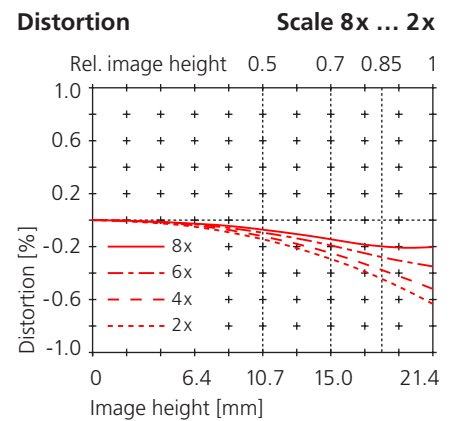
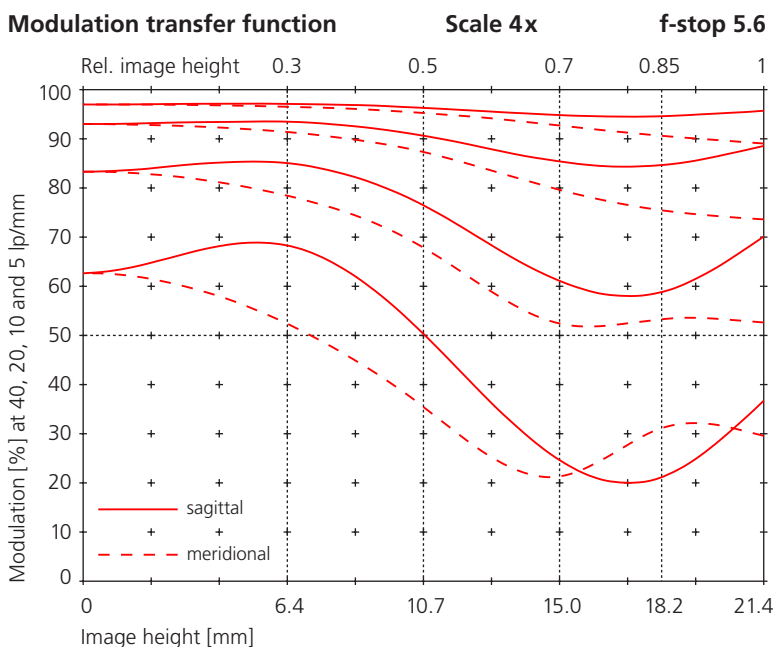
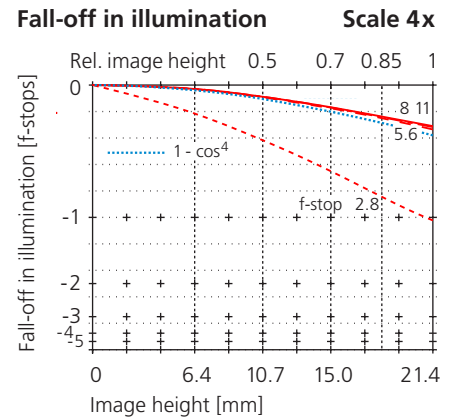
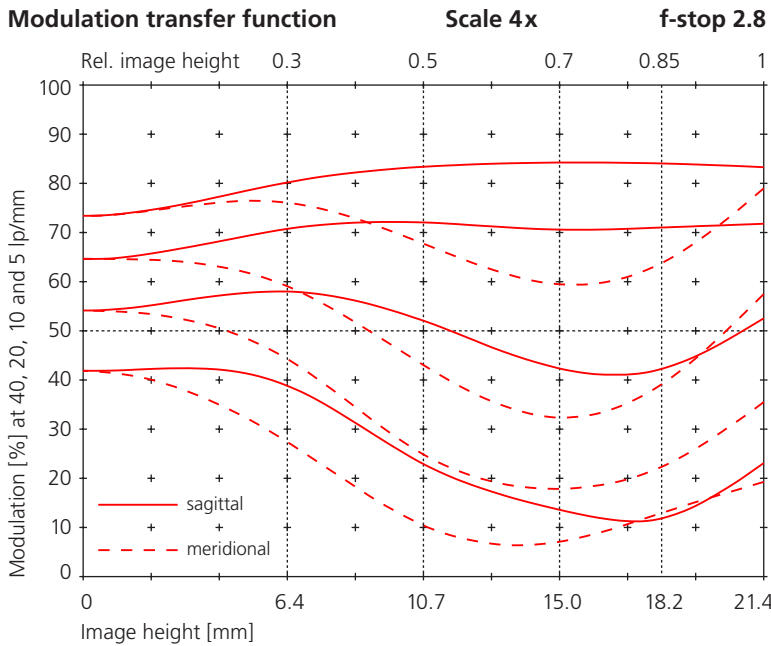
Technical data

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
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

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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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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 and 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.



Data sheets

▶ [Formats, dimensions, recommended scales, features](#)

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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

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

Rogonar-S

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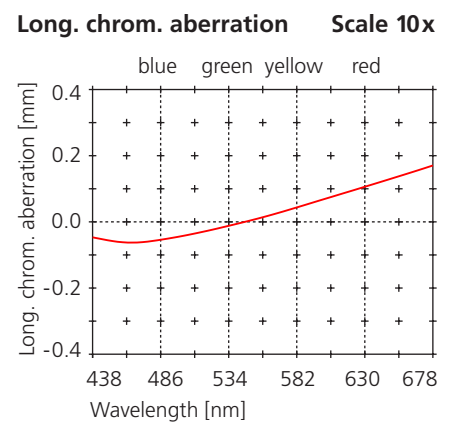
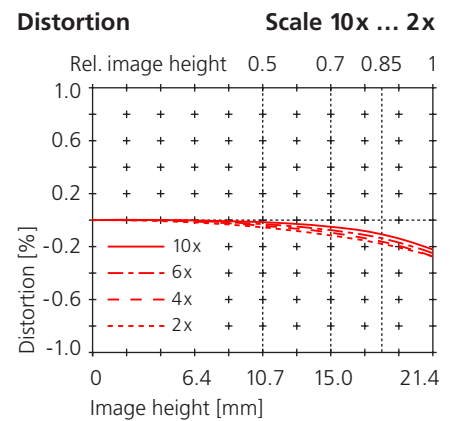
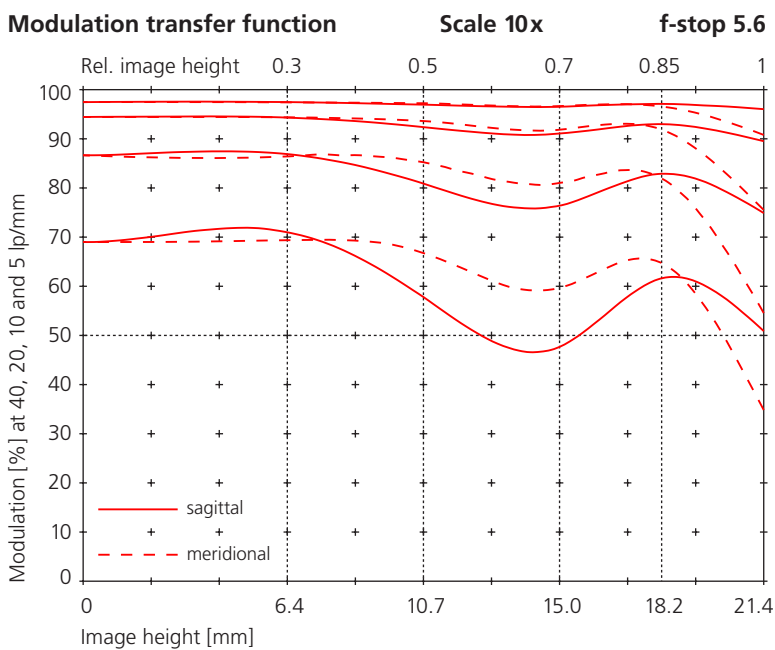
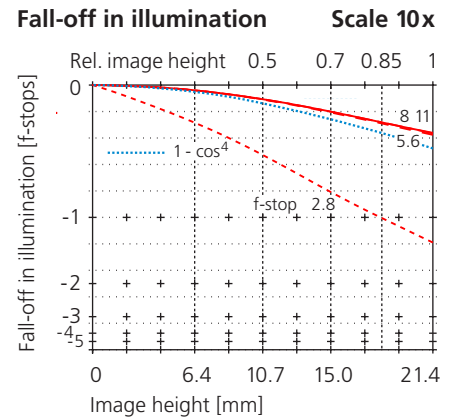
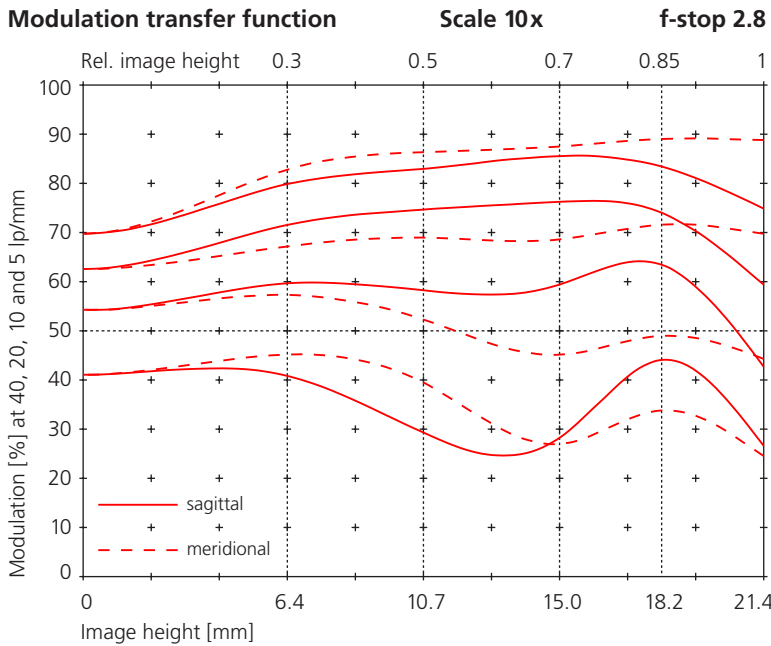
Technical data

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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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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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 and 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.



Data sheets

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Rodagon	Recommended scale range	Maximum film format
28 mm f/4	5x - 30x	18x24 mm
35 mm f/4	5x - 30x	24x24 mm
50 mm f/2.8	2x - 15x	24x36 mm
60 mm f/4	2x - 10x	40x40 mm
80 mm f/4	2x - 10x	6x7 cm
105 mm f/5.6	2x - 10x	6x9 cm
135 mm f/5.6	2x - 10x	4x5 inch
150 mm f/5.6	2x - 10x	4x5 inch
180 mm f/5.6	2x - 8x	5x7 inch
210 mm f/5.6 *	2x - 8x	5x7 inch
240 mm f/5.6 *	2x - 8x	8x10 inch
300 mm f/5.6 *	2x - 8x	8x10 inch
360 mm f/6.3 *	2x - 8x	10x12 inch

* Discontinued model, leftover stock only

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

Rodagon

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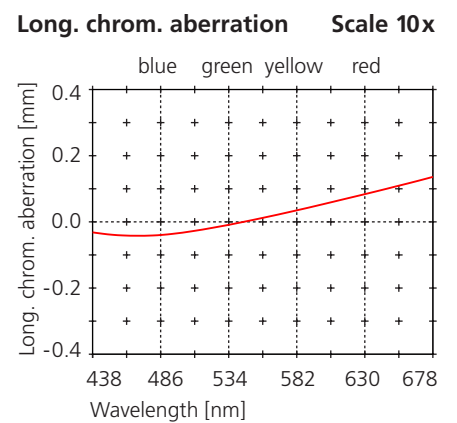
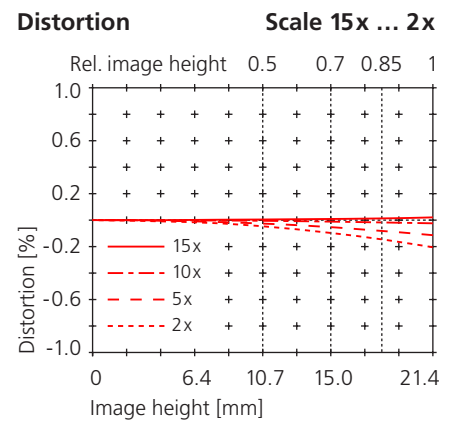
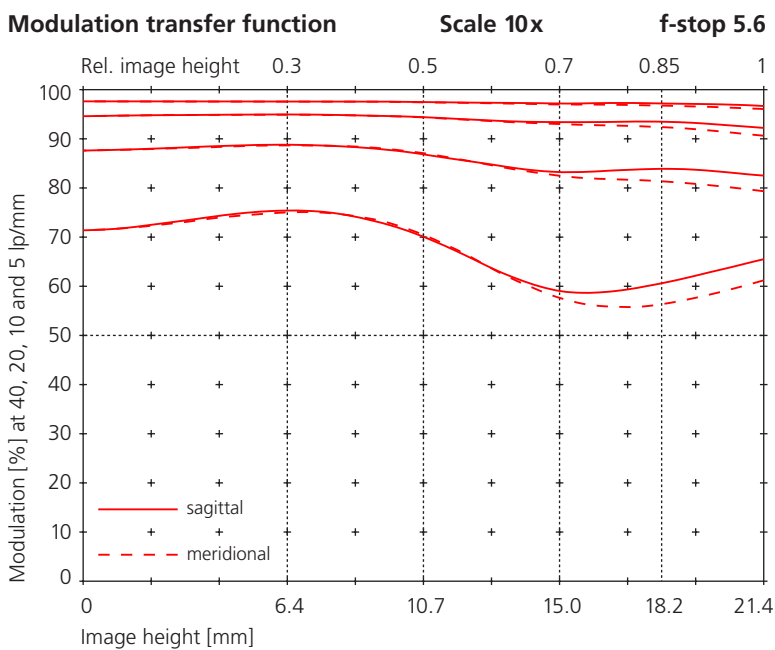
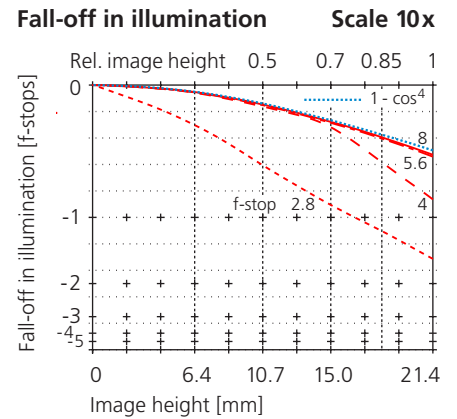
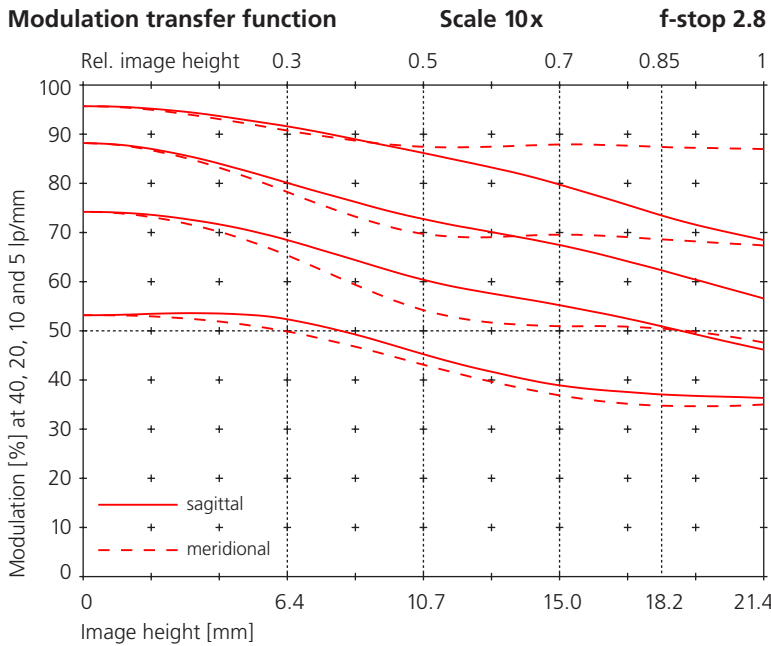
Technical data

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
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
180 mm f/5.6	5×7 inch	2-8×	45				M 58×0.75	177.0 mm	59.8 mm	60.0 mm	M 50×0,75	24.6 mm
210 mm f/5.6	5×7 inch	2-8×	45				M 67×0.75	201.0 mm	67.2 mm	70.0 mm	M 58×0,75	28.1 mm
240 mm f/5.6	8×10 inch	2-8×	45				M 77×0.75	230.0 mm	77.0 mm	80.0 mm	M 72×1	30.0 mm
300 mm f/5.6	8×10 inch	2-8×	45				M 86×1	283.0 mm	93.0 mm	90.0 mm	M 72×1	8.5 mm
360 mm f/6.3	10×12 inch	2-8×	45				M 95×1	300.0 mm	110.6 mm	100.0 mm	M 90×1	9.5 mm

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

Rodagon 50 mm f/2.8

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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

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
45 mm f/2.8 *	5x - 30x	24x36 mm
50 mm f/2.8	2x - 15x	24x36 mm
80 mm f/4	2x - 15x	6x7 cm
90 mm f/4	2x - 15x	6x7 cm
105 mm f/4	2x - 15x	6x9 cm

* Discontinued model, leftover stock only



Data sheets

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

Apo-Rodagon-N

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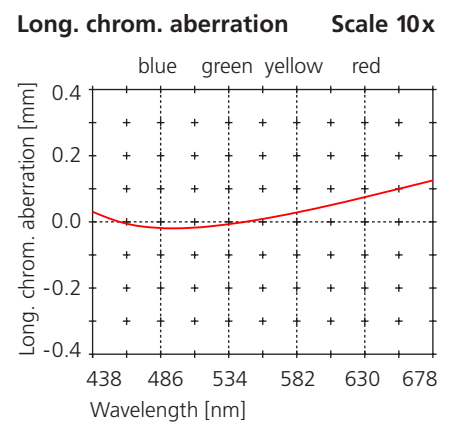
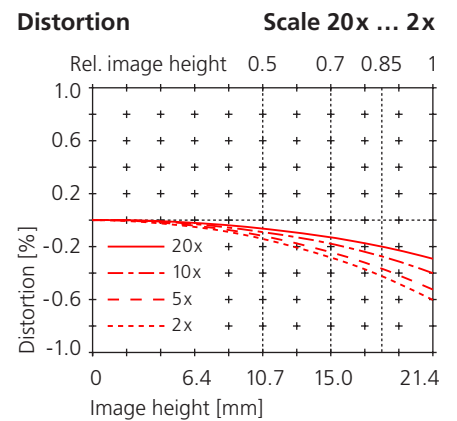
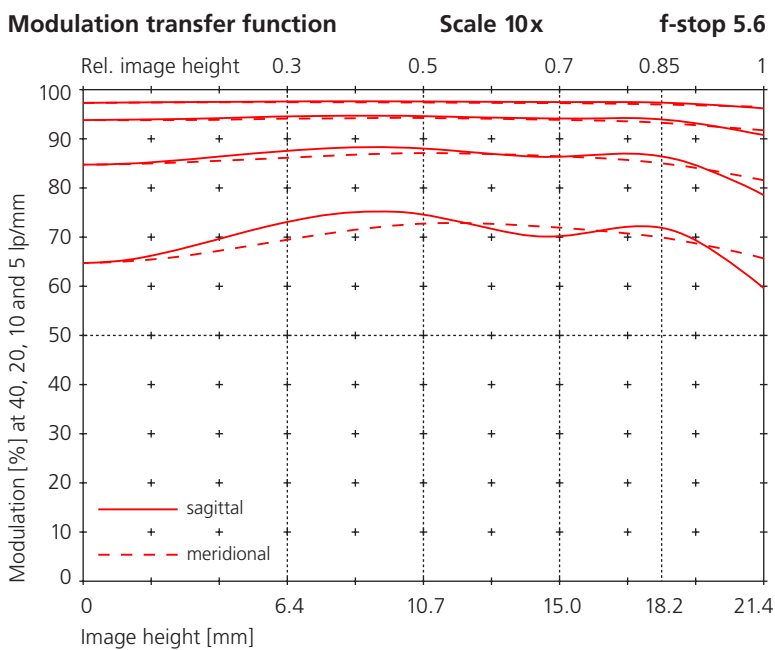
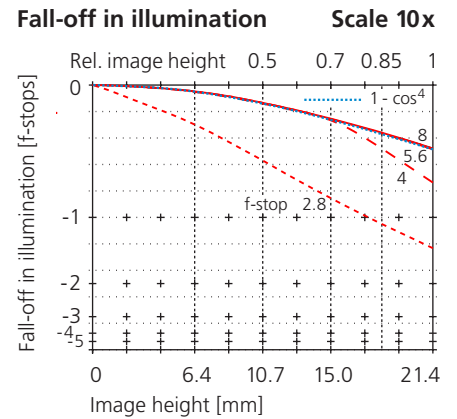
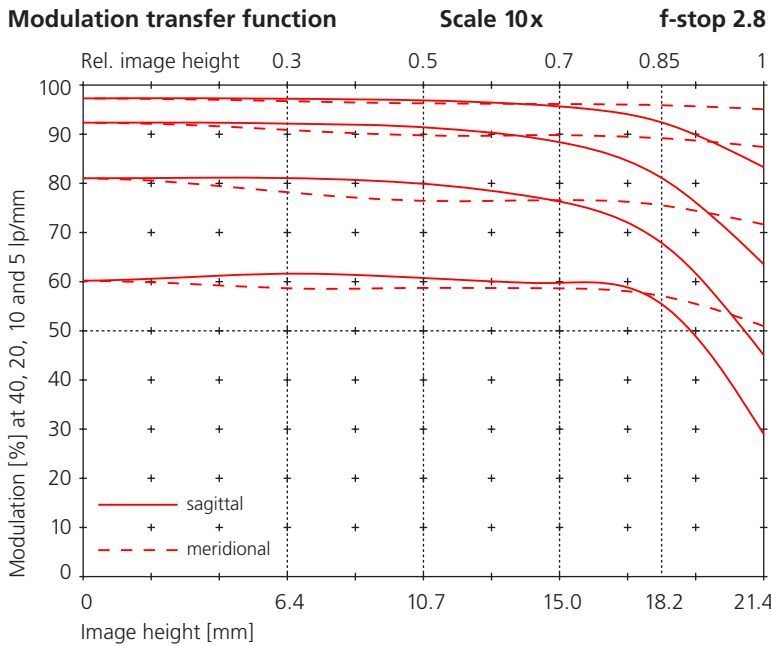
Technical data

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
45 mm f/2.8	24×36 mm	2-30×	16	•	•	•	M 40.5×0.5	47.1 mm	55.3 mm	50.0 mm	M 39×1/26"	20.9 mm
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
90 mm f/4	6×7 cm	2-15×	22	•	•	•	M 40.5×0.5	93.5 mm	43.9 mm	50.0 mm	M 39×1/26"	13.2 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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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. The three lenses from 40 mm to 80 mm focal length 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	4x - 20x	24x36 mm
60 mm f/4	4x - 15x	6x6 cm
80 mm f/4	4x - 15x	6x9 cm
120 mm f/5.6 *	4x - 15x	4x5 inch

* Discontinued model, leftover stock only



Data sheets

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

Rodagon-WA

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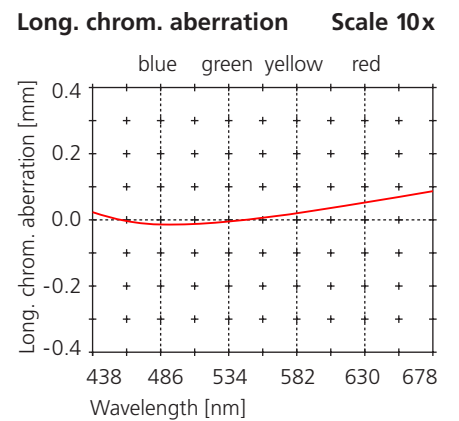
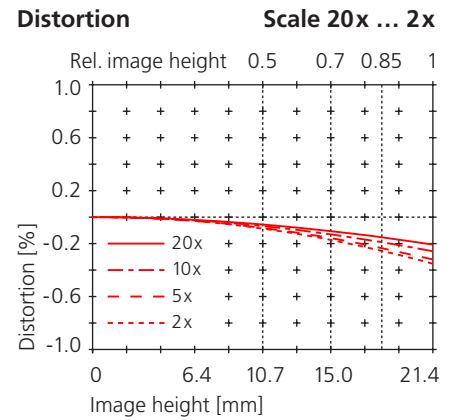
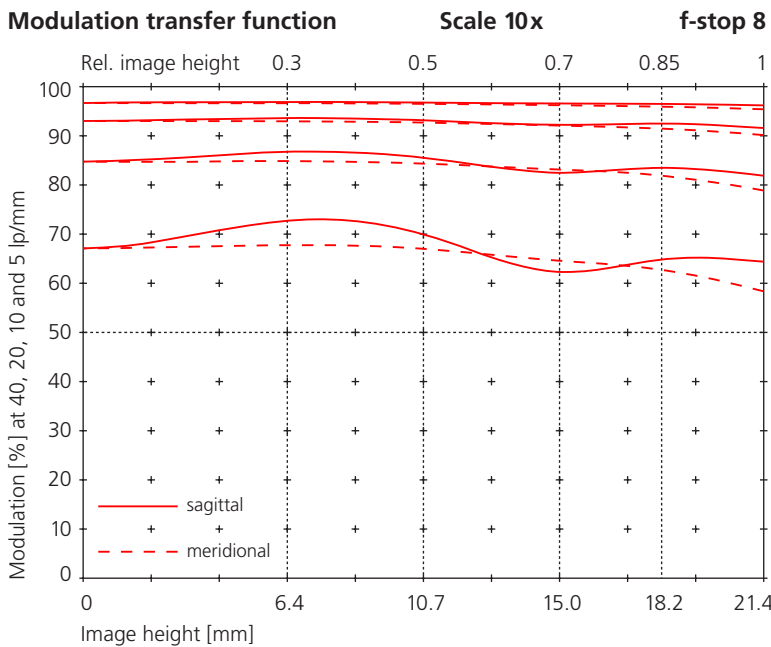
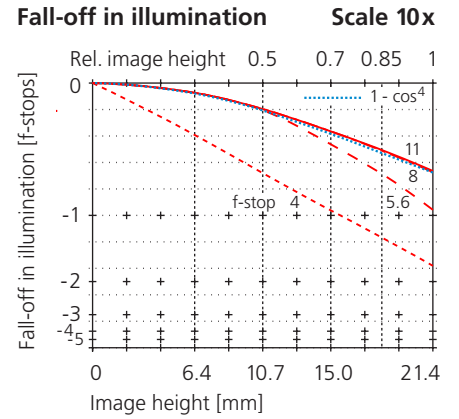
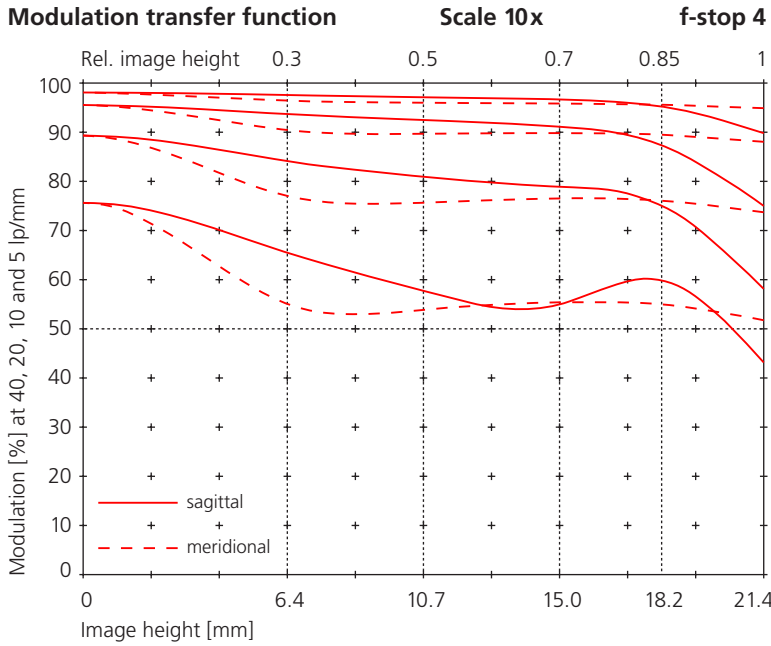
Technical data

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
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
120 mm f/5.6	4×5 inch	4-15×	45	•	•	•	M 52×0.75	116.4 mm	59.0 mm	60.0 mm	M 50×0.75	26.6 mm

¹⁾ Flange focal length at scale ∞

Rodagon-WA 40 mm f/4

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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	0.8x - 1.2x	6×6 cm
Apo-Rodagon-D 2x		
75 mm f/4.5	1.2x - 2.5x	6×7 cm
Apo-Rodagon-D		
120 mm f/5.6	0.5x - 3x	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

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

Apo-Rodagon-D

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Technical data

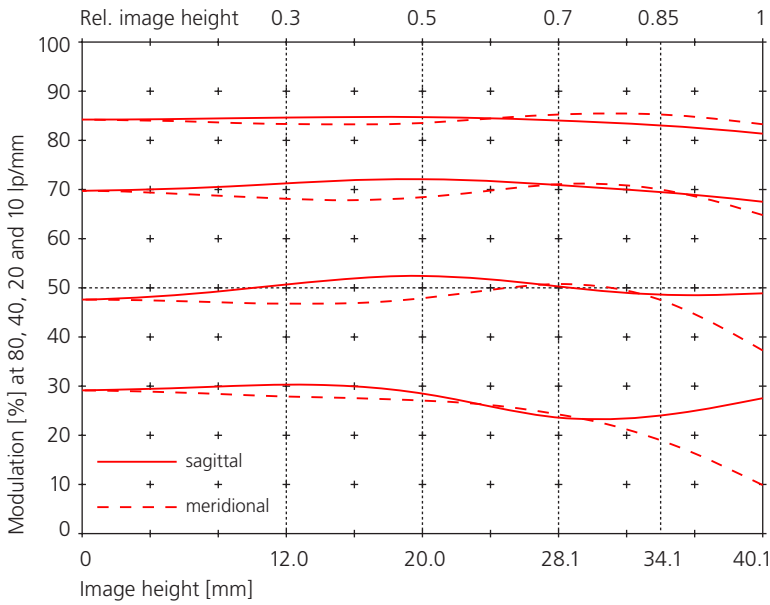
Lens	Maximum film format	Scale range	Smallest aperture Pre-selection aperture Click-stop disable	Filter thread	Flange focal length ¹⁾	Overall length	Max. diameter	Screw thread	Flange to rear edge
75 mm f/4	6×6 cm	0.8-1.2×	22 • •	M 40.5×0.5	136.7 mm	53.0 mm	50.0 mm	M 39× ¹ / ₂₆ "	18.7 mm
75 mm f/4.5	6×7 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 2× 75 mm f/4.5 and for 120 mm f/5.6 at scale 2×

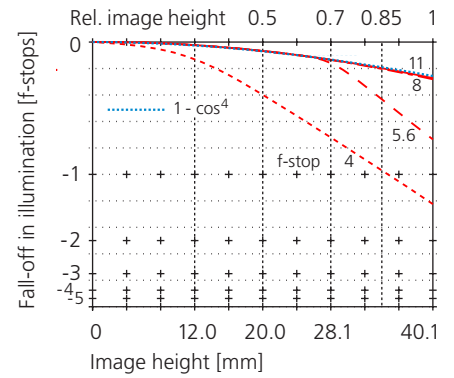
Apo-Rodagon-D 75 mm f/4

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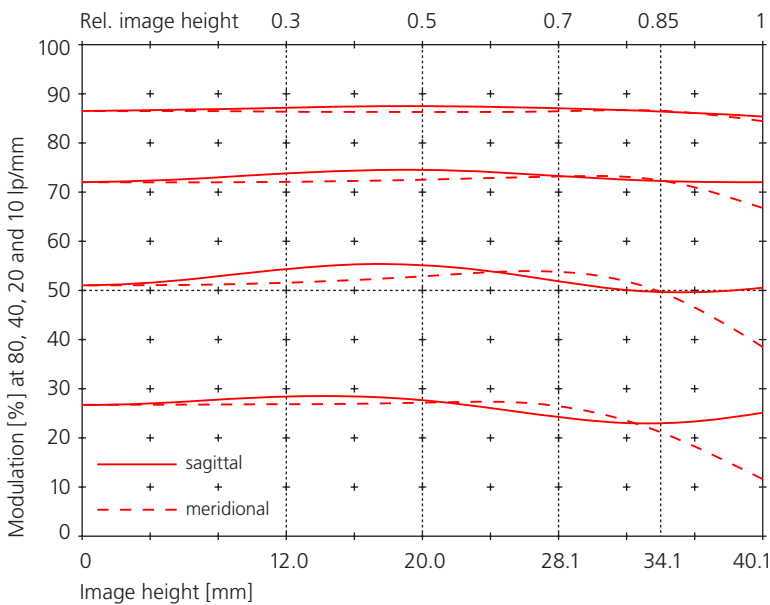
Modulation transfer function Scale 1x f-stop 4



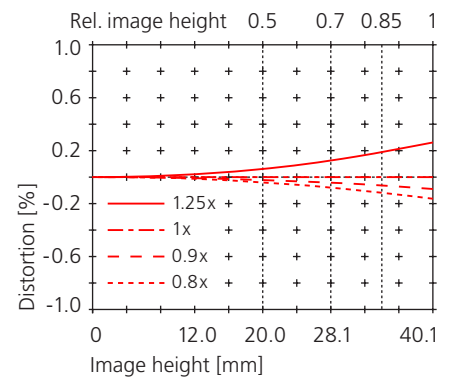
Fall-off in illumination Scale 1x



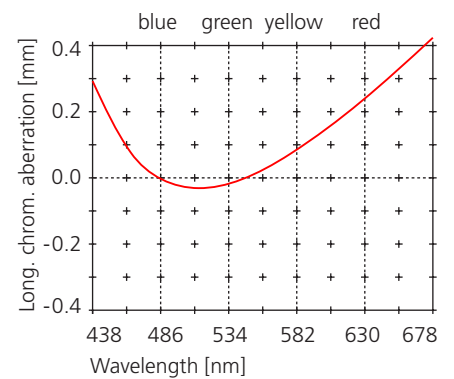
Modulation transfer function Scale 1x f-stop 5.6



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

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▶ **[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
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Rogonar-S	25 ... 35 mm	–	–	●	A: M 39×1/26" special version that shuts out light from aperture display
	50 ... 105 mm	●	●	–	
Rodagon	28 mm	–	–	●	B: M 39×1/26" standard version
	28 ... 105 mm	●	●	–	
	135 mm	–	●	–	
Apo-Rodagon-N	45 ... 105 mm	●	●	–	C: M 32×0.5
Rodagon-WA	40 ... 60 mm	●	●	–	
	80 mm	–	●	–	
Apo-Rodagon-D	1x, 2x 75 mm	–	●	–	

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

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Quality Filters

High-quality taking lenses create sharp, high-contrast images which are free from distortion. But what happens if it is too bright or if the light is not a neutral white, if there is too much UV radiation or if unwanted reflections occur on glossy surfaces? Or if 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 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 conjunction 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 completely 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 want to produce a creative shot and so 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 (conversion filters and softeners) filters are much more comfortable 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.

So the best method is to use the appropriate filters in exactly the same way as for analog photography, and then use imaging software for “fine tuning” – if it should still be necessary.



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

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Quality Filters

UV blocking filters and UV/IR blocking filters

These glass filters are practically neutral in color effect. They transmit visible light without hindrance while cutting out ultra-violet (UV) radiation. UV/IR filters block infrared radiation, too. Due to the short wavelength, UV is highly scattered and has a high intensity in hazy conditions as diffuse radiation. A color film reacts with a blue-violet veil, while b&w film gives the sky a brighter look, 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, 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.

UV/IR blocking filters have been specially designed for digital or video cameras. They filter UV as well as infrared (IR) radiation which, due to the high IR sensitivity of CCDs, can lead to reddish color shift, fogging and blur (because normal camera lenses are not color corrected for the long IR wavelengths).

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



Data sheets

▶ [Filter order numbers for filter sizes up to 60 mm](#)

▶ [Filter order numbers for filter sizes from 62 mm on](#)

UV blocking filter: for pure colors, clear distance views and ideal for protecting the front element of the lens
UV/IR blocking filter: a must for many digital cameras

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Quality Filters

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 about 1.5 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 Grandagon-N and Apo-Grandagon – please see there.

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



Data sheets

- ▶ [Filter order numbers for filter sizes up to 60 mm](#)
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Neutral density filters: free choice of shutter speed and f-stop for creative effects or depth of field manipulation

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Quality Filters

Polarizing filters

In a rotatable mount, these filters for analog as well as for digital photography contain a micro-thin polarizing film sandwiched between two protective lens 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 2x. 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. Non-conductive surfaces include glass, varnish and plastics. However, water also has a very low conductivity (in comparison with metal) so that water reflections are polarized. Even reflections on aluminum house fronts are also polarized and so can be influenced by a polarizing filter, 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) on these materials and even of a blue sky (when photographed at about right angles to the sun) according to the following rules:

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.

Filter type	Time	or	aperture correction
-------------	------	----	---------------------

Jet-Pol filter linear	2x - 3x		1 - 1.5 f-stops
Jet-Pol filter circular	2x - 3x		1 - 1.5 f-stops



Data sheets

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

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Quality Filters

Skylight and conversion filters (LB filters)

Skylight filters for analog photography with reversal film have a very pale amber tint and act like a UV filter to cut out ultra-violet radiation. In addition, they eliminate the bluish hue in 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 never be used for front-lens protection (use a neutral UV filter instead).

Conversion or light balancing (LB) filters for analogue and digital photography are blue and amber tint filters; the blue filters raise and the amber filters lower the color temperature of the light. Daylight is white at noon, but reddish at dawn and dusk. Unlike the human eye, color slide film reacts with a color shift. Daylight slide films only render colors correctly around mid-day with direct sunlight (color temperature 5500 K). Tungsten slide films, in contrast, are balanced for the light of halogen lamps (3200 K). As a measure of corrective power, the filter strength is given in "mired" or "decamired". The Kodak filter codes bear no logical relation to the filter power. The following chart shows both the Kodak codes and the decamired LB values.

The FL-D filter (FL-D = fluorescent lamp daylight type) prevents the typical and frequently irritating green hue on daylight slide film under fluorescent lighting ("daylight" fluorescent lamps).

Filter type	Time	or	aperture correction
Skylight 1A	1x	0	f-stops
81B (= LB A 2.5)	1.2x	0.3	f-stops
81EF (= LB A 5)	1.5x	0.6	f-stops
85 (= LB A 11)	2x	1	f-stop
85B (= LB A 13)	2x	1	f-stop
82A (= LB B 2)	1.2x	0.3	f-stops
82B (= LB B 3)	1.5x	0.6	f-stops
82C (= LB B 4.5)	2x	1	f-stop
80B (= LB B 11)	3x	1.6	f-stops
80C (= LB B 13)	4x	2	f-stops
FL-D (fluorescent light day)	2x	1	f-stop



Data sheets

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Skylight and conversion filters: for more natural colors despite of changing color temperature of daylight, with tungsten light and even with fluorescent tube light

Skylight and conversion filters (LB filters)

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Filter codes, mired values and applications

Common name	Kodak code	Filter color	Mired value	For slide film type	For digital	Recommended applications (examples)
Skylight filter	1A	Very pale amber	+15	Daylight	No	Slightly bluish motifs in shadow, no direct sunlight
LB filter A 2.5	81B	Very pale amber	+27	Daylight	Yes ¹⁾	Overcast sky, stronger effect than with skylight filter
LB filter A 5	81EF	Pale amber	+52	Daylight	Yes ¹⁾	Indoor architectural photos, shaded motifs with blue sky
LB filter A 11	85	Amber	+115	Tungsten	No	Daylight with white clouds, but film is a tungsten film
LB filter A 13	85B	Amber	+131	Tungsten	No	Daylight with deep blue sky, but film is a tungsten film
LB filter B 2	82A	Very pale bluish	-18	Daylight	Yes ¹⁾	Compensation of reddish color shift at sunrise or sunset
LB filter B 3	82B	Pale bluish	-32	Daylight	Yes ¹⁾	Comp. of red color shift at sunrise or sunset (red sky)
LB filter B 4.5	82C	Bluish	-45	Tungsten	No	Household tungsten light (2800 K) with tungsten film
LB filter B 11	80B	Blue	-112	Daylight	Yes ¹⁾	Nitraphot or projection bulb illumination (3400 K)
LB filter B 13	80A	Blue	-131	Daylight	Yes ¹⁾	Halogen bulb illumination (3200 K)
FLD filter	–	Pale magenta	-20	Daylight	Yes ¹⁾	Fluorescent light tube (daylight type) illumination

¹⁾ Depending on the type of camera it may be necessary to switch off the automatic white balance or to switch to the "Daylight" or to the "5500 K" setting

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Quality filters

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, they may occasionally provide interesting special effects.

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

Green filters make 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 they provide more natural gray tones. Green filters also give greater expression to portraits (but do not use if subject has skin blemishes, they would be enhanced) and provide the correct gamut conversion of the colors to gray under tungsten light with a high amber content.

Orange filters darken blue even more than yellow filters to create a very dramatic (cloud) atmosphere in landscape shots. With infrared b&w or color film, they are the most popular filters for magical effects especially in landscapes.

Red filters have an even more dramatic effect in landscape and architectural photos than yellow or orange filters. They are also ideal for "moonlight shots" during the day (underexpose slightly) and for spectacular photos with infrared color film.

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



Data sheets

▶ [Filter order numbers for filter sizes up to 60 mm](#)

▶ [Filter order numbers for filter sizes from 62 mm on](#)

Filters for black & white film: for better contrast control and for more natural conversion of colors to gray tones

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Quality filters

Softeners

The famous professional Rodenstock Imagon soft-focus lens produces beautifully softened portraits – but at the price of a whole lens. For those who only occasionally want to “soften” their shots and do not want to spend quite so much money, the Rodenstock filter program also includes the high-grade Softar softeners from Carl Zeiss in the powers I and II.

These sophisticated soft focus filters can be used like normal filters in front of any analog or digital camera lens, but they are most effective with a short telephoto lens (e.g. with a 35 mm camera with a focal length of around 85 or 105 mm) and with a larger aperture, from around f/2.8 to f/5.6. When used with a digital camera, the aperture should be fully open because of the shorter focal lengths of these cameras. Otherwise there may be irregular distribution of sharpness over the image area when the very small entrance pupil is smaller than the softening “drops” on the surface of the Softar filters. This is the reason why it is also not recommended to use a Softar with a wide-angle lens with a smaller aperture than f-stop 8, with a standard lens with a smaller aperture than f-stop 11 or with a telephoto lens with a smaller aperture than f-stop 16.

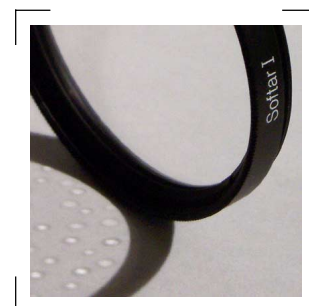
Although softeners have become popular as “de-wrinklers”, their use is by no means limited to this application. The diffusion created at the edge of highlights or other very bright parts spreading into the shadows can, for example, give even bouquets a touch of romance or emphasize the dream-like gaze of a little girl. The most effective diffusion is achieved when a slanted backlighting generates haloes at the edges which then light up against a dark background (blonde hair in front of a dark wall is the classical example).

It is a special feature of the Zeiss Softar I und II (when compared with other softeners) that they do not produce just a blurred image. On the contrary, similar to the Rodenstock Imagon, they provide a really sharp core picture which is covered by a light veil or halo. This reduces harsh contrast and adds a romantic note without any significant loss in detail.

Type of softener	Time	or	aperture correction
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Zeiss Softar I	2.5x - 3x	1.3 - 1.5 f-stops
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Zeiss Softar II	8x - 12x	3 - 3.6 f-stops
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Data sheets

▶ [Filter order numbers for filter sizes up to 60 mm](#)

▶ [Filter order numbers for filter sizes from 62 mm on](#)

Zeiss Softar I und II: the perfect softener for portraits as well as for romantic landscapes and bouquets

Filter order numbers for sizes up to E60

[◀ Back to filter overview](#)

▶ [Chart for sizes from 62 mm on](#)

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

Order number = Filter type no. completed with 3 digit no.	Nominal size Outer Ø [mm]	M 27x0.75 E27 29	M 37x0.75 E37 39	M 39x0.5 E39 40.5	M 40,5x0.5 E40.5 42	M 43x0.75 E43 45	M 46x0.75 E46 48	M 49x0.75 E49 51	M 52x0.75 E52 54	M 55x0.75 E55 57	M 58x0.75 E58 60	M 60x0.75 E60 62
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Filter designation	Exposure factor	Filter type no.	Normal mount					Slimline mount (Jet-Pol linear only with normal mount)						
			→		←									
▶ UV blocking filter	1x	1095.0030...	027	037	039	040	043	046	049	052	055	058	060	
▶ UV/IR blocking filter	1x	1095.0031...	-	-	-	040	-	-	-	052	055	058	-	
▶ ND 2x	2x	1095.2030...	-	037	039	040	043	046	049	052	055	058	060	
▶ ND 4x	4x	1095.2060...	-	037	039	040	043	046	049	052	055	058	060	
▶ ND 8x	8x	1095.2090...	-	-	039	040	043	046	049	052	055	058	060	
▶ Jet-Pol linear	2 - 3x	1095.0087...	-	037	039	040	043	046	049	052	055	058	060	
▶ Jet-Pol circular	2 - 3x	1095.0088...	027	037	039	040	043	046	049	052	055	058	060	
▶ Skylight filter	1x	1095.0040...	027	037	039	040	043	046	049	052	055	058	060	
▶ 81B LB A 2.5	1.2x	1095.0041...	-	037	039	040	043	046	049	052	055	058	060	
▶ 81EF LB A 5	1.5x	1095.0042...	-	037	039	040	043	046	049	052	055	058	060	
▶ 85 LB A 11	2x	1095.0043...	-	037	039	040	043	046	049	052	055	058	060	
▶ 85B LB A 13	2x	1095.0044...	-	037	039	040	043	046	049	052	055	058	060	
▶ 82A LB B 2	1.2x	1095.0045...	-	037	039	040	043	046	049	052	055	058	060	
▶ 82B LB B 3	1.5x	1095.0046...	-	037	039	040	043	046	049	052	055	058	060	
▶ 82C LB B 4.5	2x	1095.0047...	-	037	039	040	043	046	049	052	055	058	060	
▶ 80B LB B 11	3x	1095.0048...	-	037	039	040	043	046	049	052	055	058	060	
▶ 80A LB B 13	4x	1095.0049...	-	037	039	040	043	046	049	052	055	058	060	
▶ FL-D filter	2x	1095.0050...	-	037	039	040	043	046	049	052	055	058	060	
▶ Medium yellow (8)	2.5 - 3x	1095.1008...	-	037	039	040	043	046	049	052	055	058	060	
▶ Dark yellow (15)	4x	1095.1015...	-	037	039	040	043	046	049	052	055	058	060	
▶ Yellowish green (11)	2x	1095.1011...	-	037	039	040	043	046	049	052	055	058	060	
▶ Green (13)	3x	1095.1013...	-	037	039	040	043	046	049	052	055	058	060	
▶ Orange (22)	4x	1095.1022...	-	037	039	040	043	046	049	052	055	058	060	
▶ Bright red (25)	8x	1095.1025...	-	037	039	040	043	046	049	052	055	058	060	
▶ Dark red (29)	8 - 12x	1095.1029...	-	037	039	040	043	046	049	052	055	058	060	
▶ Zeiss Softar I	1x	1095.0071...	-	-	-	-	-	-	-	052	055	058	-	
▶ Zeiss Softar II	1x	1095.0072...	-	-	-	-	-	-	-	052	055	058	-	

Filter order numbers for sizes from E 62 on

[◀ Back to filter overview](#)

▶ [Chart for sizes up to 62 mm](#)

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

Order number = Filter type no. completed with 3 digit no.	Nominal size Outer Ø [mm]	M 62x0.75 E 62 65	M 67x0.75 E 67 70	M 72x0.75 E 72 75	M 77x0.75 E 77 80	M 82x1 E 82 85	M 86x1 E 86 90	M 95x1 E 95 100	M 100x1 E 100 103	M 105x1 E 105 110	M 112x1.5 E 112 115	M 127x1 E 127 132
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Filter designation	Exposure factor	Filter type no.	Slimline mount (Jet-Pol linear only with normal mount)							Normal mount			
			→ ←										
▶ UV blocking filter	1x	1095.0030...	062	067	072	077	082	086	095	100	105	112	127
▶ UV/IR blocking filter	1x	1095.0031...	062	067	072	077	082	-	-	-	-	-	-
▶ ND 2x	2x	1095.2030...	062	067	072	077	082	086	095	100	105	112	127
▶ ND 4x	4x	1095.2060...	062	067	072	077	082	086	095	100	105	112	127
▶ ND 8x	8x	1095.2090...	062	067	072	077	082	086	095	100	105	112	127
▶ Jet-Pol linear	2 - 3x	1095.0087...	062	067	072	077	082	086	095	-	105	-	-
▶ Jet-Pol circular	2 - 3x	1095.0088...	062	067	072	077	082	086	095	-	105	-	-
▶ Skylight filter	1x	1095.0040...	062	067	072	077	082	086	095	100	105	112	127
▶ 81B LB A 2.5	1.2x	1095.0041...	062	067	072	077	082	086	095	100	105	112	127
▶ 81EF LB A 5	1.5x	1095.0042...	062	067	072	077	082	086	095	100	105	112	127
▶ 85 LB A 11	2x	1095.0043...	062	067	072	077	082	086	095	100	105	112	127
▶ 85B LB A 13	2x	1095.0044...	062	067	072	077	082	086	095	100	105	112	127
▶ 82A LB B 2	1.2x	1095.0045...	062	067	072	077	082	086	095	100	105	112	127
▶ 82B LB B 3	1.5x	1095.0046...	062	067	072	077	082	086	095	100	105	112	127
▶ 82C LB B 4.5	2x	1095.0047...	062	067	072	077	082	086	095	100	105	112	127
▶ 80B LB B 11	3x	1095.0048...	062	067	072	077	082	086	095	100	105	112	127
▶ 80A LB B 13	4x	1095.0049...	062	067	072	077	082	086	095	100	105	112	127
▶ FL-D filter	2x	1095.0050...	062	067	072	077	082	086	095	100	105	112	127
▶ Medium yellow (8)	2.5 - 3x	1095.1008...	062	067	072	077	082	086	095	100	105	112	127
▶ Dark yellow (15)	4x	1095.1015...	062	067	072	077	082	086	095	100	105	112	127
▶ Yellowish green (11)	2x	1095.1011...	062	067	072	077	082	086	095	100	105	112	127
▶ Green (13)	3x	1095.1013...	062	067	072	077	082	086	095	100	105	112	127
▶ Orange (22)	4x	1095.1022...	062	067	072	077	082	086	095	100	105	112	127
▶ Bright red (25)	8x	1095.1025...	062	067	072	077	082	086	095	100	105	112	127
▶ Dark red (29)	8 - 12x	1095.1029...	062	067	072	077	082	086	095	100	105	112	127
▶ Zeiss Softar I	1x	1095.0071...	062	067	072	077	082	086	095	-	105	-	-
▶ Zeiss Softar II	1x	1095.0072...	062	067	072	077	082	086	095	-	105	-	-

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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.

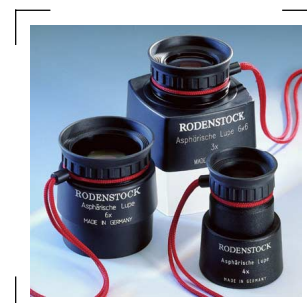
Their multi-element optical design is optimized for the special demands of visual usage and comprises different glass types for eliminating color fringes as well as aspherical lens surfaces for achieving uniform sharpness up to the margin, freedom from distortion and good flatness of field. So these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



Data sheet

[▶ Technical specifications](#)

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

**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

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