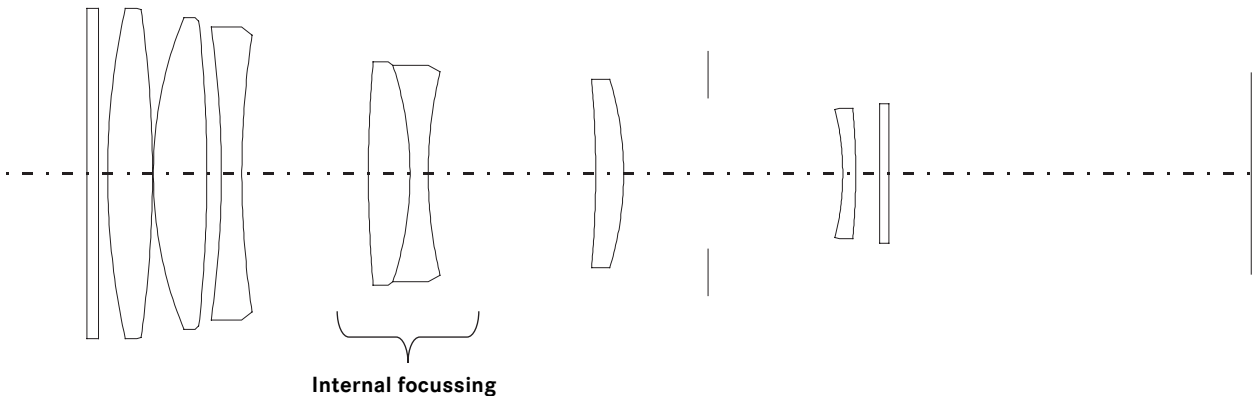




This apochromatically corrected lens with internal focusing is free of distortion and it delivers the highest resolution with optimal contrast rendition and color fidelity over the entire focusing range – even at full aperture. The rubber-armored lens hood, protecting it against impact damage, and a rugged tripod base make it an ideal lens for animal and landscape photography. And it bridges considerable distances, bringing distant objects up close. Thanks to its compact size, it is easy to use for hand-held photography. It focuses down to 1.7 m (5'7") for a reproduction ratio of 1:5. The LEICA MACRO-ADAPTER-R transforms it into a full-fledged macro lens. Attaching a LEICA APO-EXTENDER-R 1.4 x or 2 x creates the high-performance combinations 400 mm f/5.6 and 560 mm f/8.0. With the LEICA APO-EXTENDER-R 2 x, a reproduction ratio of 1:2 can be achieved.

— Lens shape



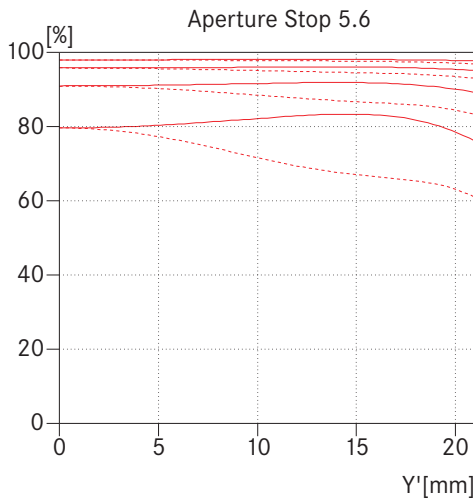
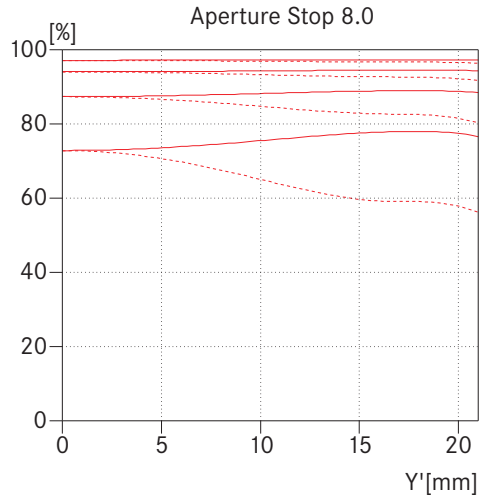
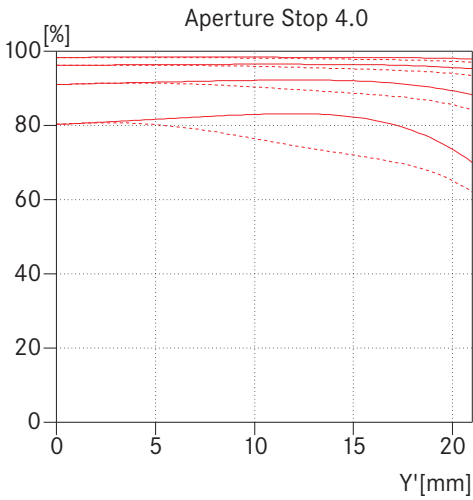


— Engineering drawing

Technical Data

Angle of view (diagonal, horizontal, vertical)	8.8°, 7.4°, 4.9°
Optical design	Number of elements / groups: 7 / 6, built-in protective filter in front of front lens element Focal length: 283 mm Entrance pupil: 288 mm (related to the first lens surface in light direction) Focusing range: 1.70 m to Infinity, can be focused beyond infinity, focusing does not have to be corrected for IR-photography
Distance setting	Scale: Combined meter/feet-increments Smallest object field: 120 mm x 180 mm Highest reproduction ratio: 1:5
Diaphragm	Setting / Type: Preset diaphragm with clickstops (including half values), Fully automatic diaphragm Smallest aperture: f/22
Bayonet	LEICA R quick-change bayonet for LEICA R3 to LEICA R9 with mechanical, and, for LEICA R8/R9, additional electronic exposure control
Filter (type)	Series 5.5 filters in filter drawer, additional internal thread for screw-in type filters E 77
Lens hood	Built-in, telescopic, rubber-armed
Dimensions and weight	Length: 208 mm Largest diameter: 88 mm Weight: approx. 1.875 g

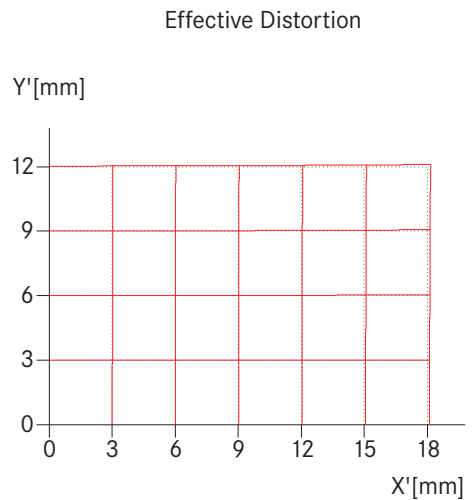
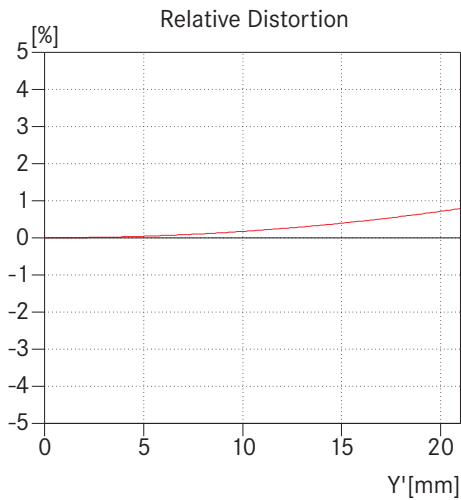
— MTF graphs



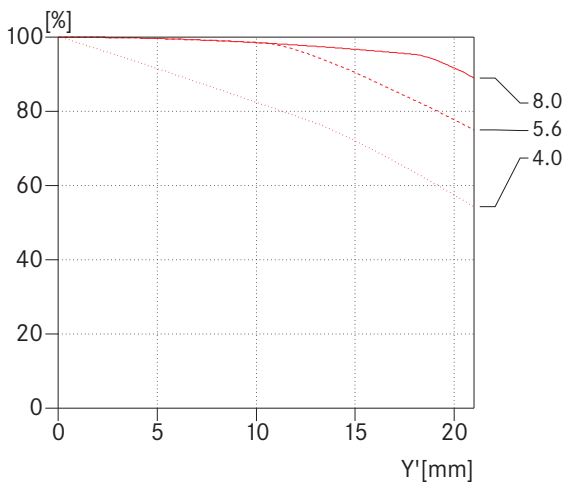
The MTF is indicated both at full aperture and at f/5.6 at long taking distances (infinity). Shown is the contrast in percentage for 5, 10, 20 and 40 lp/mm across the height of the 35 mm film format, for tangential (dotted line) and sagittal (solid line) structures, in white light. The 5 and 10 lp/mm will give an indication regarding the contrast ratio for large object structures. The 20 and 40 lp/mm records the resolution of finer and finest object structures.

— sagittal structures
 - - - tangential structures

— Distortion



— Vignetting



Distortion is the deviation of the real image height (in the picture) from the ideal image height. The relative distortion is the percentage deviation. The ideal image height results from the object height and the magnification. The image height of 21.6mm is the radial distance between the edge and the middle of the image field for the format 24mm x 36mm. The graph of the effective distortion illustrates the appearance of straight horizontal and vertical lines in the picture.

Vignetting is a continuous decrease of the illumination to the edges of the image field. The graph shows the percentage lost of illumination over the image height. 100% means no vignetting.

- sagittal structures
- - - tangential structures



— Depth of field table

	Aperture Stop						Magnification
	4,0	5,6	8	11	16	22	
1,7	1,694 - 1,706	1,693 - 1,707	1,690 - 1,710	1,686 - 1,714	1,680 - 1,721	1,672 - 1,729	1/4,75
2	1,993 - 2,008	1,990 - 2,010	1,986 - 2,014	1,981 - 2,019	1,973 - 2,028	1,962 - 2,039	1/5,81
2,5	2,489 - 2,511	2,485 - 2,515	2,479 - 2,521	2,471 - 2,530	2,458 - 2,543	2,443 - 2,560	1/7,57
3	2,984 - 3,016	2,979 - 3,021	2,970 - 3,031	2,959 - 3,042	2,941 - 3,062	2,919 - 3,086	1/9,33
3,5	3,479 - 3,521	3,472 - 3,529	3,460 - 3,541	3,445 - 3,557	3,420 - 3,584	3,391 - 3,616	1/11,1
4	3,973 - 4,028	3,963 - 4,038	3,947 - 4,054	3,928 - 4,075	3,896 - 4,109	3,859 - 4,152	1/12,9
4,5	4,466 - 4,535	4,453 - 4,547	4,434 - 4,568	4,409 - 4,594	4,370 - 4,638	4,323 - 4,692	1/14,6
5	4,958 - 5,043	4,943 - 5,059	4,919 - 5,084	4,889 - 5,116	4,840 - 5,171	4,782 - 5,238	1/16,4
6	5,940 - 6,061	5,918 - 6,084	5,883 - 6,121	5,841 - 6,168	5,771 - 6,247	5,690 - 6,345	1/19,9
8	7,894 - 8,109	7,855 - 8,150	7,795 - 8,216	7,720 - 8,300	7,600 - 8,445	7,460 - 8,624	1/27,0
10	9,836 - 10,17	9,775 - 10,24	9,682 - 10,34	9,567 - 10,47	9,383 - 10,70	9,171 - 10,99	1/34,0
12	11,77 - 12,24	11,68 - 12,34	11,54 - 12,49	11,38 - 12,69	11,12 - 13,03	10,83 - 13,46	1/41,0
15	14,64 - 15,38	14,50 - 15,54	14,30 - 15,78	14,05 - 16,09	13,65 - 16,64	13,21 - 17,35	1/51,6
20	19,36 - 20,68	19,12 - 20,96	18,77 - 21,40	18,34 - 21,98	17,68 - 23,02	16,94 - 24,40	1/69,2
30	28,59 - 31,56	28,07 - 32,22	27,31 - 33,27	26,42 - 34,69	25,07 - 37,35	23,61 - 41,12	1/104
∞	609,2 - ∞	435,8 - ∞	305,0 - ∞	221,8 - ∞	152,5 - ∞	110,9 - ∞	1/∞

