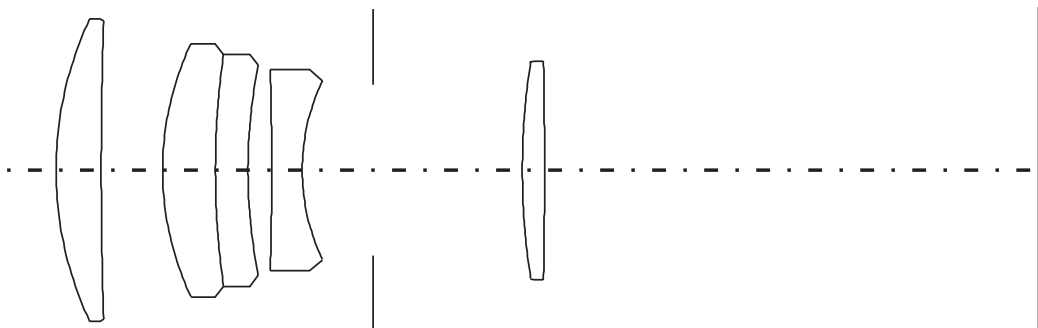




A telephoto lens without compromises, it offers outstanding imaging performance at full aperture that cannot be further improved by stopping down. Minimal vignetting and the very slightest distortion are additional strengths. Even the finest details are rendered clearly with rich contrast. It is the longest focal length in the Leica M system and it bridges considerable distances, thus judiciously rounding out any serious outfit. It delivers impressive landscape photographs with a typical telephoto effect : the foreground and the background are visibly compressed. Another benefit is the ability to make format-filling portraits from a discreet distance that the subject will not consider as obtrusive.

— Lens shape





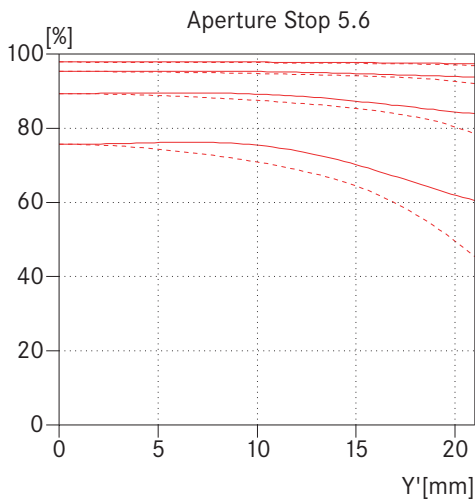
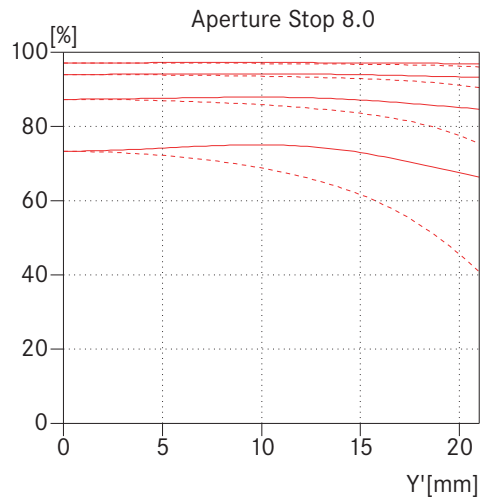
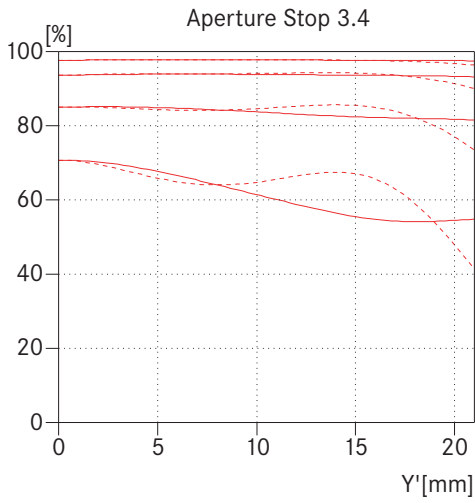
— Engineering drawing

Technical Data

Angle of view (diagonal, horizontal, vertical)	18°, 15°, 10.2°
Optical design	Number of elements / groups: 5 / 4 Focal length: 136 mm Entrance pupil: 68 mm (related to the first lens surface in light direction) Focusing range: 1.5 m to Infinity
Distance setting	Scale: combined meter/feet-increments Smallest object field: 220 mm x 330 mm Highest reproduction ratio: 1:9
Diaphragm	Setting / Type: with clickstops (including half values), manual diaphragm Smallest aperture: f/22
Bayonet	Leica M quick-change bayonet
Filter (type)	internal thread for screw-in type filters E 49
Lens hood	built-in, telescopic
Dimensions and weight	Length: 104.7 mm Largest diameter: 58.5 mm Weight: approx. 450 g



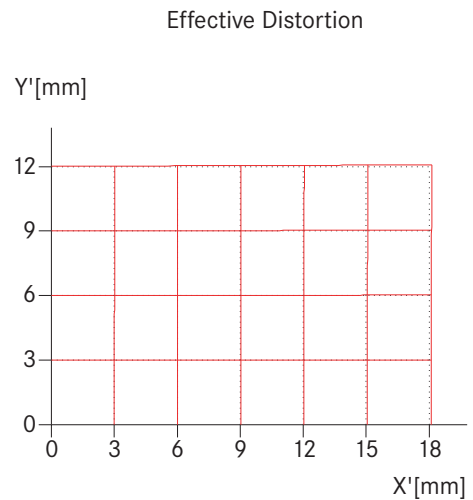
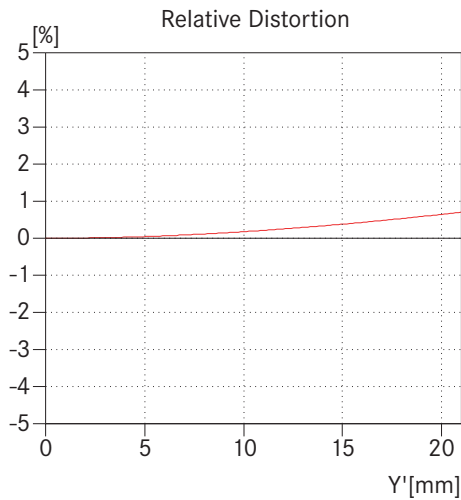
— MTF graphs



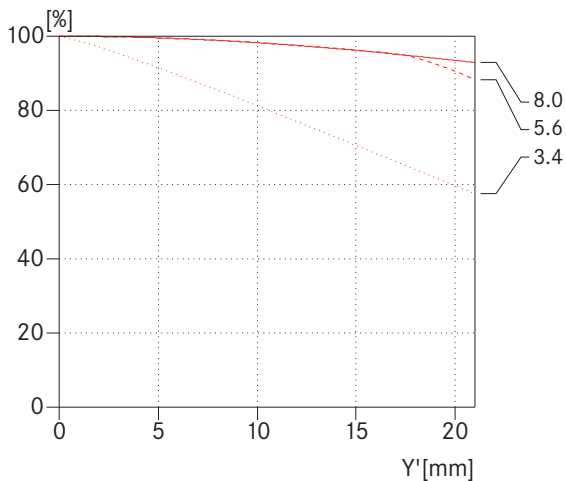
The MTF is indicated both at full aperture and at f/5.6 at long taking distances (infinity). Shown is the contrast in percentage for 5, 10, 20 and 40 lp/mm across the height of the 35 mm film format, for tangential (dotted line) and sagittal (solid line) structures, in white light. The 5 and 10 lp/mm 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
	3,4	4	5,6	8	11	16	22	
1,5	1,488 - 1,512	1,486 - 1,515	1,480 - 1,520	1,472 - 1,529	1,461 - 1,541	1,445 - 1,560	1,425 - 1,584	1/8,94
1,7	1,684 - 1,716	1,681 - 1,719	1,674 - 1,727	1,663 - 1,738	1,650 - 1,753	1,628 - 1,779	1,603 - 1,810	1/10,4
2	1,978 - 2,023	1,974 - 2,027	1,964 - 2,038	1,949 - 2,054	1,930 - 2,076	1,900 - 2,112	1,865 - 2,157	1/12,6
2,5	2,465 - 2,536	2,459 - 2,543	2,443 - 2,560	2,419 - 2,587	2,390 - 2,621	2,343 - 2,680	2,289 - 2,755	1/16,3
3	2,949 - 3,053	2,940 - 3,062	2,917 - 3,088	2,883 - 3,128	2,841 - 3,178	2,774 - 3,267	2,698 - 3,380	1/20,0
4	3,909 - 4,096	3,893 - 4,113	3,852 - 4,160	3,792 - 4,233	3,719 - 4,328	3,604 - 4,496	3,475 - 4,715	1/27,4
5	4,857 - 5,152	4,833 - 5,179	4,769 - 5,255	4,676 - 5,373	4,566 - 5,527	4,392 - 5,806	4,202 - 6,181	1/34,7
7	6,721 - 7,304	6,674 - 7,360	6,552 - 7,514	6,377 - 7,759	6,171 - 8,089	5,857 - 8,705	5,520 - 9,583	1/49,4
10	9,436 - 10,64	9,344 - 10,76	9,105 - 11,09	8,769 - 11,64	8,383 - 12,40	7,810 - 13,92	7,218 - 16,32	1/71,4
20	17,85 - 22,74	17,52 - 23,29	16,70 - 24,94	15,59 - 27,90	14,41 - 32,75	12,78 - 46,15	11,26 - 90,76	1/145
∞	165,2 - ∞	140,7 - ∞	100,5 - ∞	70,34 - ∞	51,17 - ∞	35,20 - ∞	25,62 - ∞	1/∞

