



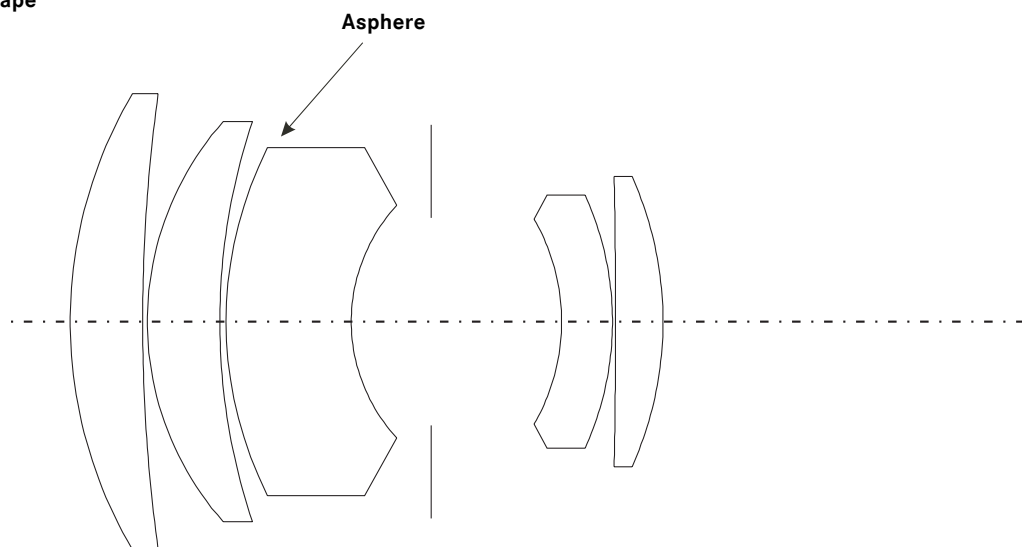
# LEICA APO-SUMMICRON-M 90 mm f/2 ASPH.

1



This lens is unique because apochromatic correction and an aspherical surface are combined for the first time. Two of the five lens elements are made of high-refraction optical glass, and two others make judicious use of anomalous partial dispersion. Brilliance and resolving power are already outstanding at full aperture. Artificial vignetting is extremely low. These features lead to superlative results – in every application: such as portraiture, reportage or studio photography. In addition, its compact design and high speed make it ideal for hand-held photography.

— Lens shape



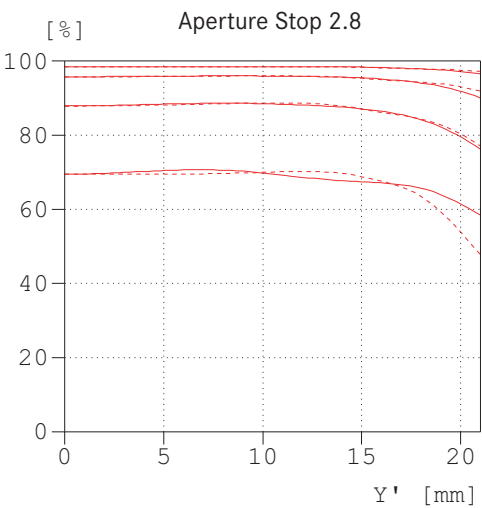
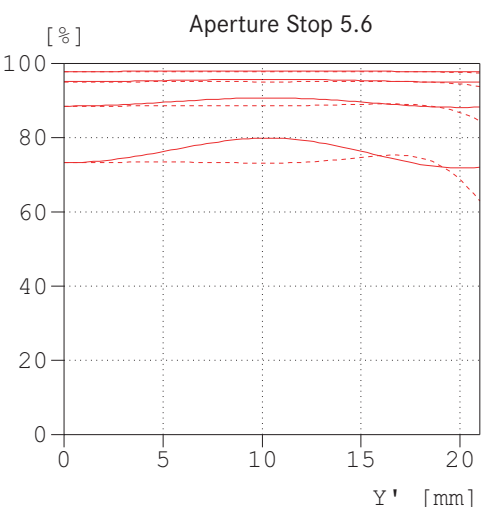
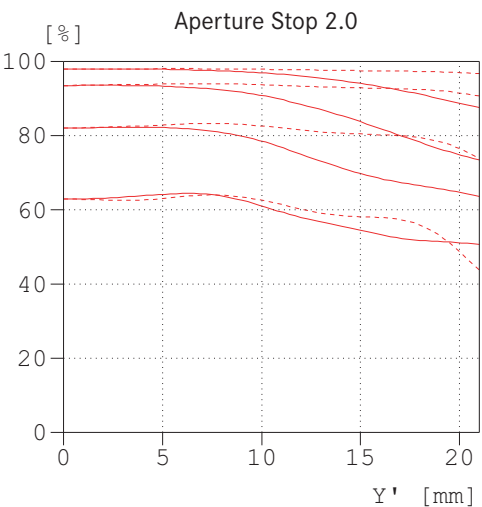


— Engineering drawing

Technical Data	
Angle of view (diagonal, horizontal, vertical)	27°, 23°, 15°
Optical design	Number of elements / groups: 5 / 5 Focal length: 90.9 mm Entrance pupil: 58.6 mm (related to the first lens surface in light direction) Focusing range: 1 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/16
Bayonet	Leica M quick-change bayonet
Filter (type)	internal thread for screw-in type filters E 55
Lens hood	built-in, telescopic
Dimensions and weight	Length: 78 mm Largest diameter: 64 mm Weight: approx. 500 g



MTF graphs

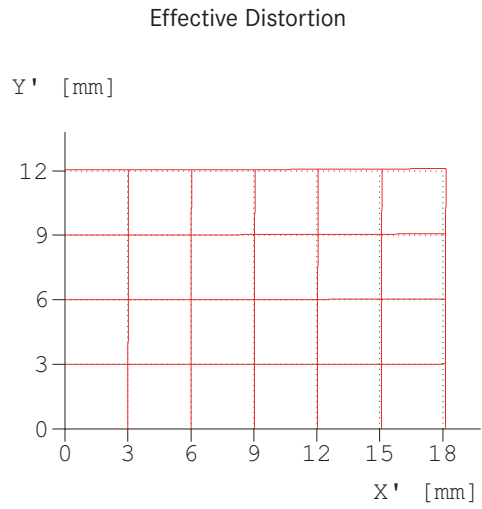
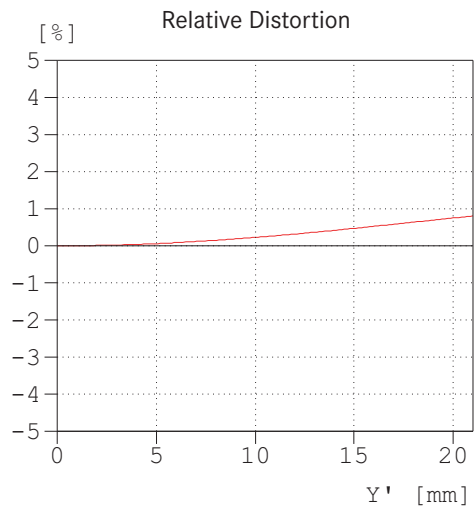


The MTF is indicated both at full aperture and at f/5.6 at long taking distances (infinity). Shown is the contrast in percentage for 5, 10, 20 and 40 lp/mm across the height of the 35 mm film format, for tangential (dotted line) and sagittal (solid line) structures, in white light. The 5 and 10 lp/mm 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.

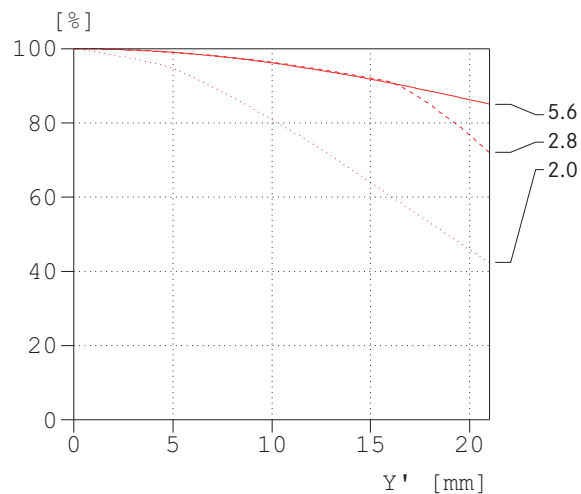
- sagittal structures
- - - tangential structures



— 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
		2	2,8	4	5,6	8	11	16	
Distance Setting [m]	1	0,993 - 1,007	0,990 - 1,010	0,986 - 1,014	0,980 - 1,020	0,972 - 1,029	0,962 - 1,041	0,946 - 1,061	1/9,18
	1,2	1,190 - 1,211	1,186 - 1,215	1,179 - 1,221	1,171 - 1,230	1,159 - 1,244	1,145 - 1,261	1,122 - 1,291	1/11,4
	1,7	1,679 - 1,722	1,670 - 1,731	1,658 - 1,745	1,641 - 1,763	1,617 - 1,792	1,588 - 1,829	1,543 - 1,894	1/16,9
	2	1,970 - 2,031	1,958 - 2,043	1,941 - 2,063	1,918 - 2,089	1,886 - 2,130	1,846 - 2,183	1,784 - 2,278	1/20,2
	3	2,932 - 3,071	2,906 - 3,101	2,867 - 3,146	2,817 - 3,209	2,746 - 3,307	2,661 - 3,440	2,531 - 3,687	1/31,3
	4	3,879 - 4,129	3,833 - 4,183	3,765 - 4,266	3,679 - 4,383	3,557 - 4,571	3,415 - 4,831	3,203 - 5,336	1/42,3
	7	6,635 - 7,408	6,499 - 7,586	6,305 - 7,869	6,064 - 8,280	5,736 - 8,986	5,373 - 10,06	4,861 - 12,56	1/75,3
	∞	125,3 - ∞	89,51 - ∞	62,65 - ∞	44,77 - ∞	31,35 - ∞	22,81 - ∞	15,70 - ∞	1/∞

