

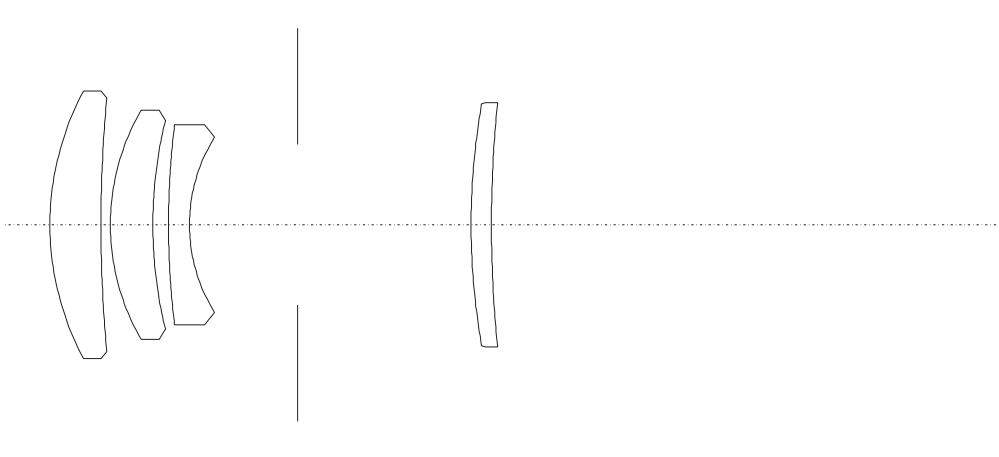


LEICA MACRO-ELMAR-M 90 mm f/4



Repeatedly we manage to surprise you with unusual, if not unique lens concepts. The new LEICA MACRO-ELMAR-M 90mm f/4 is one of these cases, in which the seemingly impossible was realized. You can use the LEICA MACRO-ELMAR-M 90mm f/4 either on its own or together with the LEICA MACRO-ADAPTER-M. 90 mm-lenses are traditionally very popular among Leica M photographers. Along with the 35- and 50mm-models, they belong to most standard outfits. With its low weight and compact dimensions the LEICA MACRO-ELMAR-M 90mm f/4 is first choice whenever you wish to limit your outfit to a minimum without forfeiting the maximum in image quality. Its performance is very good across the whole image field, and it stands any comparison with the already legendary LEICA MACRO-ELMARIT-R 100mm f/2.8.

— Lens shape



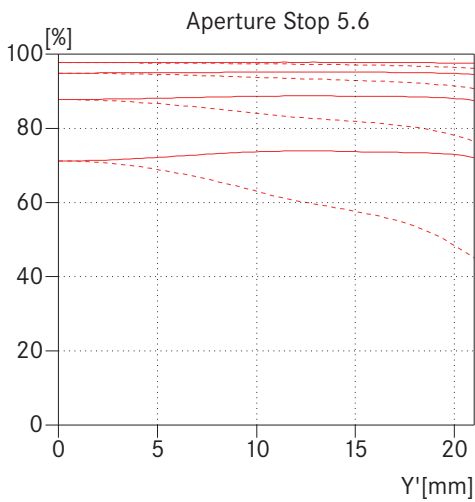
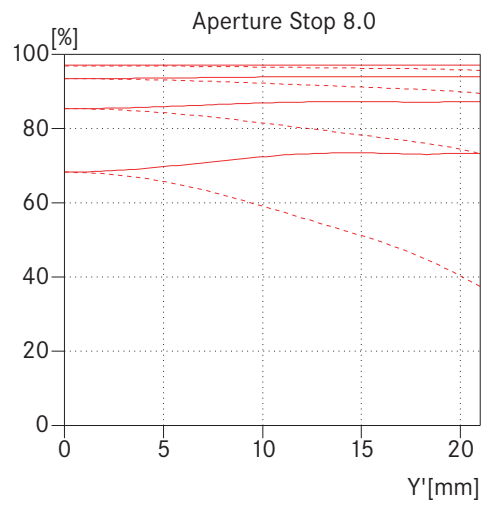
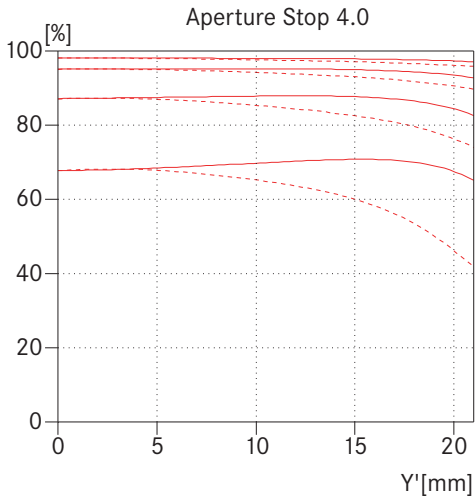


— Engineering drawing

Technical Data

Angle of view (diagonal, horizontal, vertical)	27°, 23°, 15°
Optical design	Number of elements / groups: 4 / 4 Focal length: 90.0 mm Entrance pupil: 32.3 mm (related to the first lens surface in light direction) Focusing range: 0.77 m to Infinity (with LEICA MACRO-ADAPTER-M: 0.5 to 0.76 m)
Distance setting	Scale: combined meter/feet-increments Smallest object field: 161 mm x 241 mm (with LEICA MACRO-ADAPTER-M: 72 x 108 mm) Highest reproduction ratio: 1:6.7 (with LEICA MACRO-ADAPTER-M: 1:3)
Diaphragm	Setting / Type: with clickstops (including half values) Smallest aperture: f/22
Bayonet	Leica M quick-change bayonet
Filter (type)	internal thread for screw-in type filters E 39, non-rotating lens mount
Lens hood	separate metal lens hood, can be attached in reverse for storage
Dimensions and weight	Length: 59 mm (lens extended, in working position), 41 mm (lens collapsed, in storage position) Largest diameter: 52 mm Weight: approx. 240 g (black anodized aluminium version), 320 g (silver chrome-plated brass version)

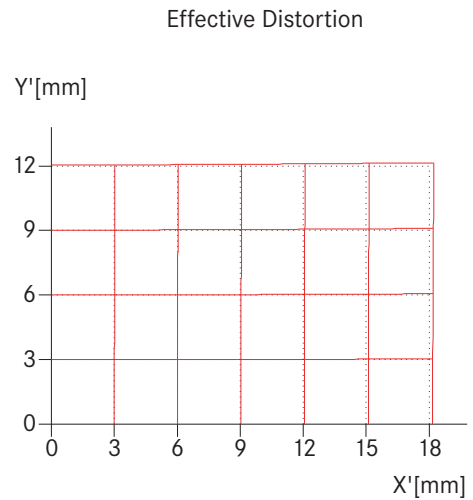
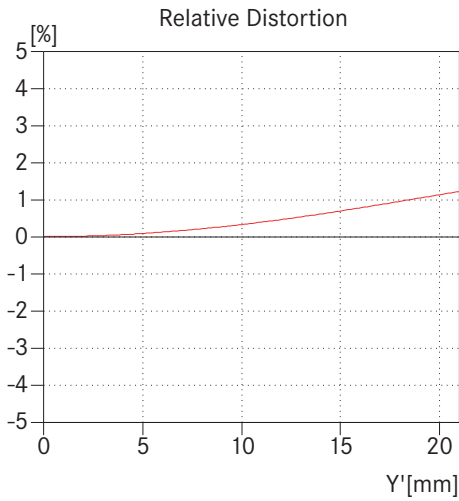
— MTF graphs



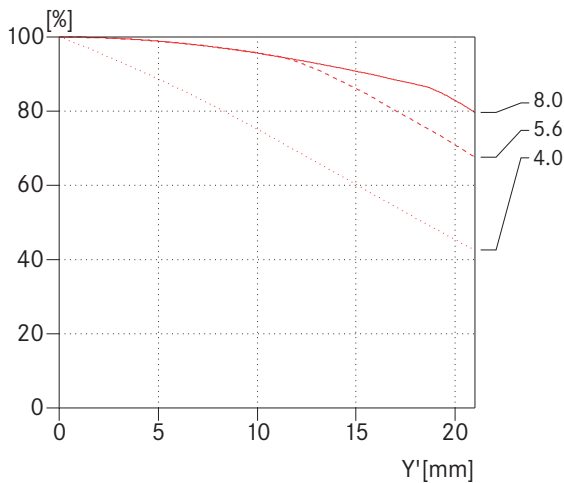
The MTF is indicated both at full aperture and at f/5.6 at long taking distances (infinity). Shown is the contrast in percentage for 5, 10, 20 and 40 lp/mm across the height of the 35 mm film format, for tangential (dotted line) and sagittal (solid line) structures, in white light. The 5 and 10 lp/mm 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	5,6	8	11	16	22	
0,8	0,791 - 0,809	0,788 - 0,813	0,783 - 0,818	0,776 - 0,825	0,766 - 0,837	0,754 - 0,852	1/6,72
1	0,985 - 1,015	0,980 - 1,021	0,972 - 1,030	0,962 - 1,041	0,946 - 1,061	0,927 - 1,087	1/8,98
1,2	1,178 - 1,222	1,171 - 1,231	1,159 - 1,244	1,144 - 1,262	1,121 - 1,292	1,094 - 1,330	1/11,2
1,5	1,466 - 1,536	1,454 - 1,549	1,435 - 1,571	1,412 - 1,600	1,376 - 1,650	1,334 - 1,715	1/14,6
2	1,938 - 2,066	1,917 - 2,090	1,884 - 2,132	1,844 - 2,186	1,781 - 2,283	1,711 - 2,411	1/20,2
3	2,861 - 3,153	2,814 - 3,213	2,742 - 3,313	2,656 - 3,449	2,525 - 3,701	2,384 - 4,059	1/31,3
5	4,621 - 5,447	4,498 - 5,630	4,312 - 5,952	4,101 - 6,411	3,792 - 7,359	3,479 - 8,949	1/53,5
10	8,580 - 11,99	8,159 - 12,92	7,563 - 14,78	6,930 - 18,02	6,084 - 28,40	5,308 - 92,51	1/109
∞	59,78 - ∞	43,86 - ∞	30,71 - ∞	22,35 - ∞	15,38 - ∞	11,20 - ∞	1/∞

