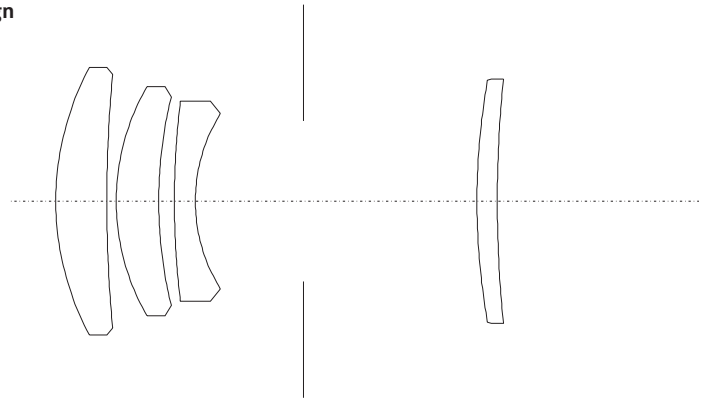
LEICA MACRO-ELMAR-M 90 mm f/4

The LEICA Macro-Elmar-M 90mm f/4 is a high-performance telephoto lens. Its mid-length focal length is best suited for portraits, in which the key to the picture is to clearly distinguish the people from the background. For travel photography, it is an indispensable companion for detailed views, e.g. for landscape shots. In reportage photography, it allows discreet shots to be taken from longer distances. On cameras with live view function such as the Leica M (type 240), photos from up to 41cm are possible when using the Leica Macro Adapter M (order no. 14 652), for scales up to 1:2. The image quality is excellent over the entire image field and is largely retained, even in the close up range. It is comparable with that of the legendary Leica Macro-Elmarit-R 100mm f/2.8. Even with an aperture of 4, the Leica Macro- Elmar-M 90mm f/4 delivers almost optimum performance, i.e. the maximum aperture can be used as the “standard” aperture with no restrictions; stopping down essentially only increases the depth of field. The slight pulvinate distortion at the corners of the image is almost negligible at 1.3%. With a maximum of 1.2 aperture stops at full aperture, vignetting, i.e. dimming of the corners of the image, hardly ever occurs even in critical situations. Stopping down by 2 stops almost entirely eliminates it. The multi-layer reflection-minimizing coating of the individual lens surfaces guarantees the neutral reproduction that is typical of Leica. With a retractable design, its length of just 41mm when retracted make it an extremely compact alternative to the two other 90mm lenses in the M range.

Optical design



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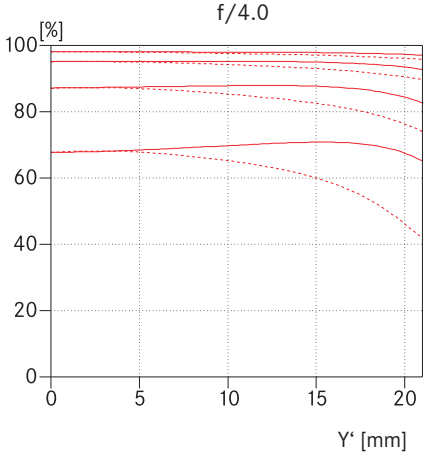
Engineering drawing

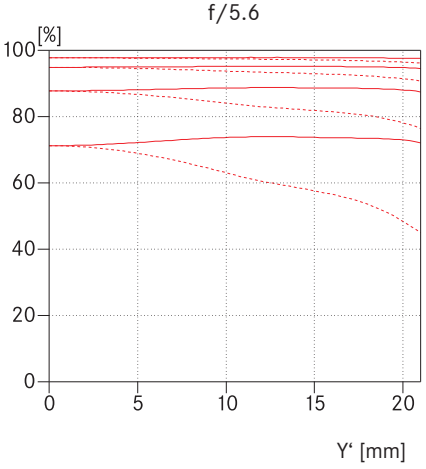
Technical Data	
Angle of view (diagonal, horizontal, vertical)	27° / 23° / 15° (M8: 20° / 17° /11°)
Optical design	**Number of lenses/groups:** 4 / 4 **Position of entrance pupil** (from bayonet flange)**:** 22 mm **Focus range:** 0,8 m to ∞
Distance setting	**Scales:** Combined meter / graduation **Smallest object field:** 169 x 244 mm (Adapter 72 x 108 mm) M8:122 x 183 mm (Adapter: 36 x 54 mm) **Largest reproduction ratio:** approx. 1:6,7
Aperture	**Setting / Function:** prefix with click-stops, half steps, click-stop **Lowest value:** 22
Bayonet	Leica M quick-change bayonet
Lens hood	separate lens hood
Filter mount	E39
Dimensions and weight	**Length:** approx. 59 mm **Largest diameter:** approx. 52 mm **Weight:** approx. 230 g

MTF-graphs

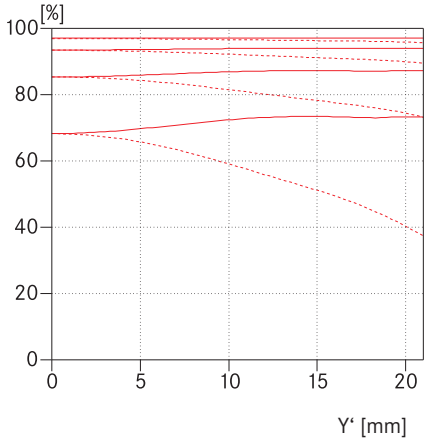
f/4.0



f/5.6



f/8.0

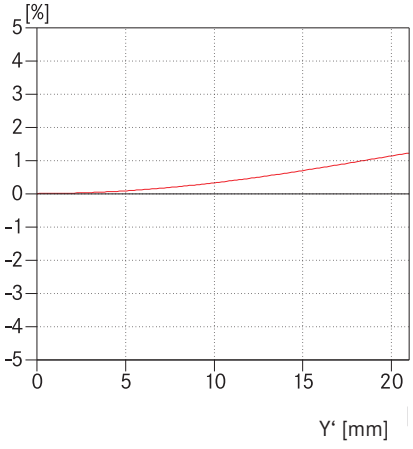


The MTF is indicated at full aperture, at f/2,8 and f/5,6 at long taking distances (infinity). Shown is the contrast in percentage for 5, 10, 20 and 40 lp/mm accross the height of the 35 mm film format, for tangential (dotted line) and sagittal (solid line) structures, in white light. The 5 and 10 lp/mm 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.

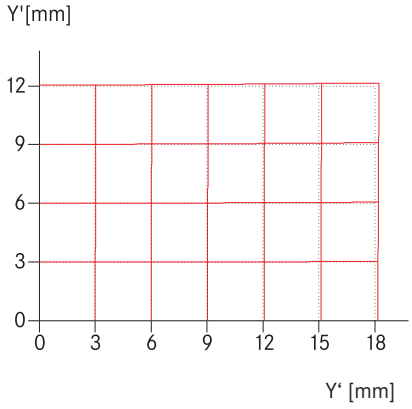
tangential structures
sagittal structures

Distortion

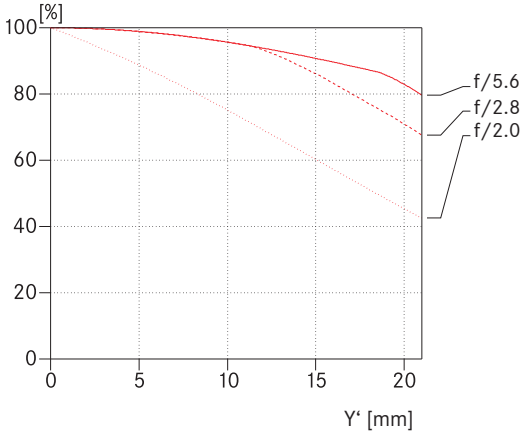
Relative Distortion



Effective Distortion



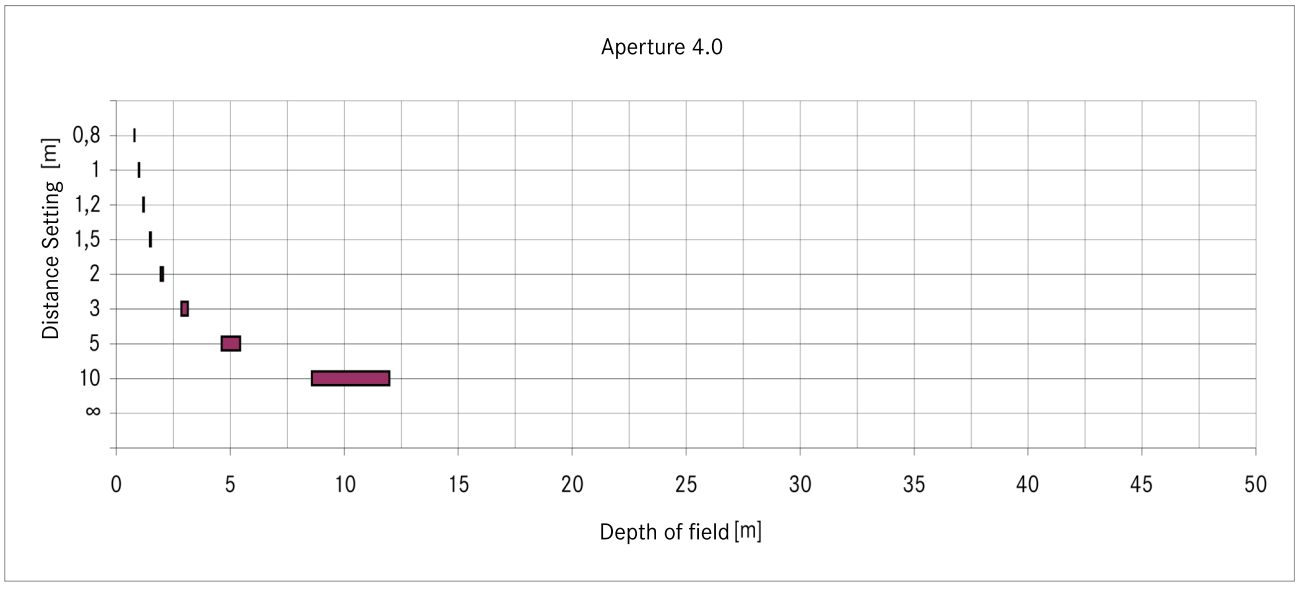
Vignetting

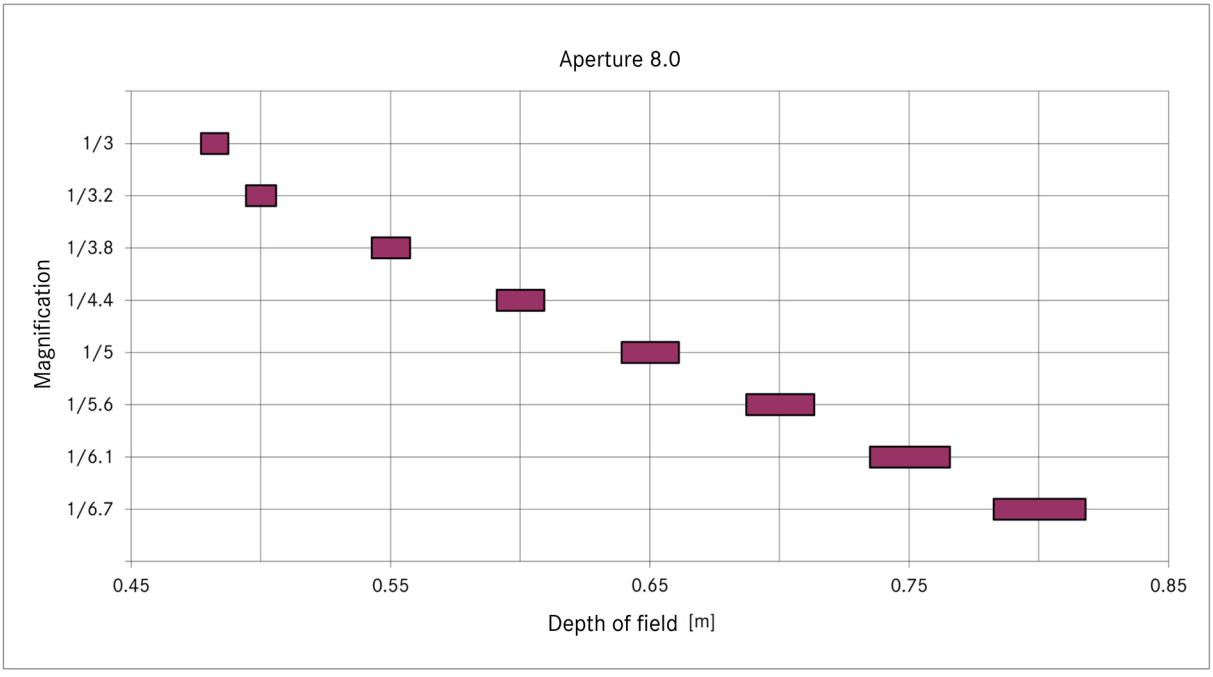


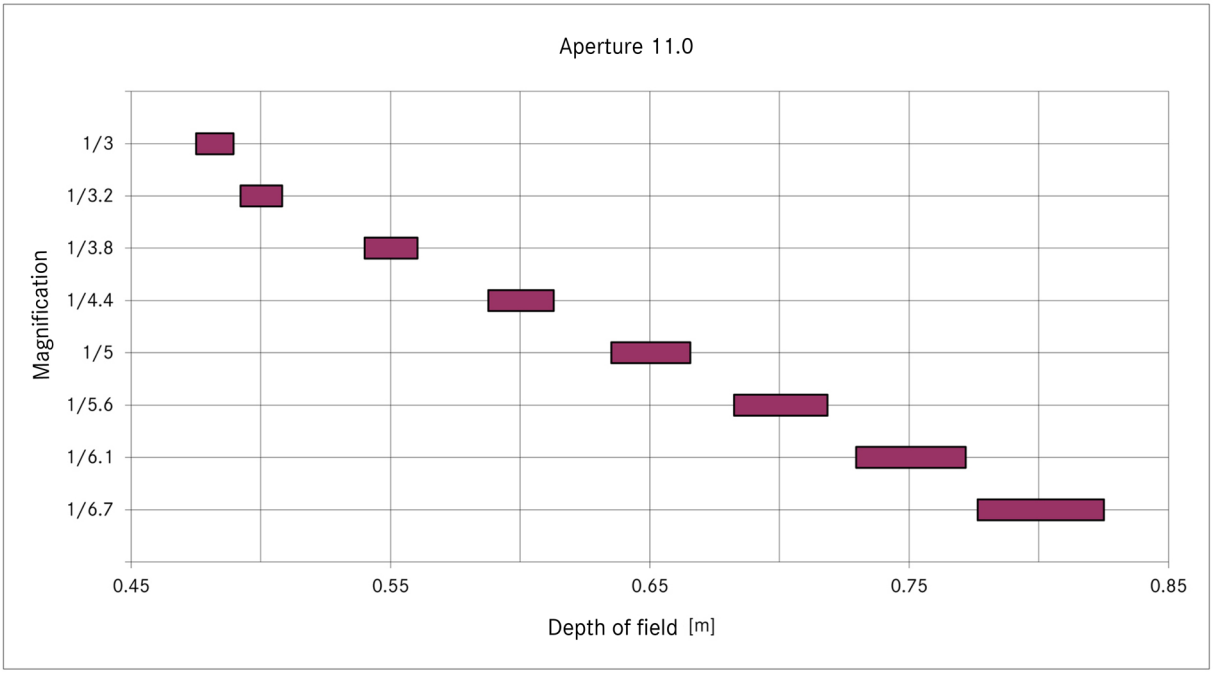
Distortion is the deviation of the real image height (in the picture) from the ideal image height. The relative distortion is the percentage deviation. The ideal image height results from the object height and the magnification. The image height of 21.6 mm is the radial distance between the edge and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

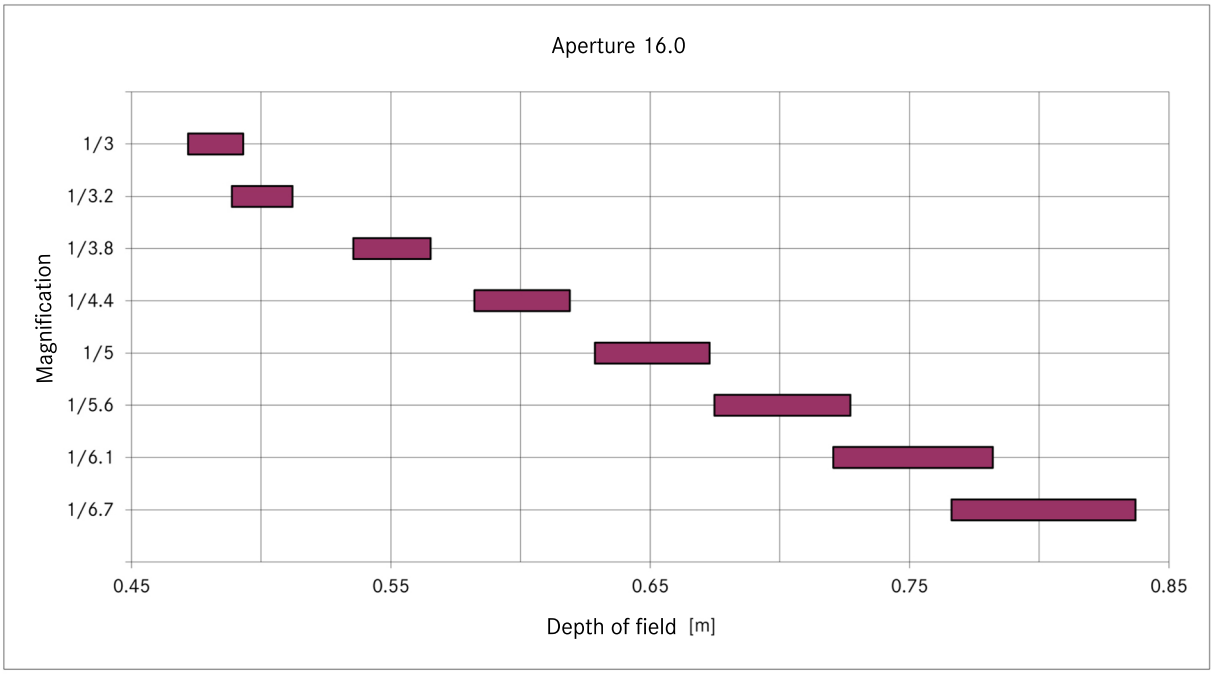
Vignetting is a continous decrease of the illumination towards the edges of the image field. The graph shows the percentage lost of illumination over the image height. 100% means no vignetting.

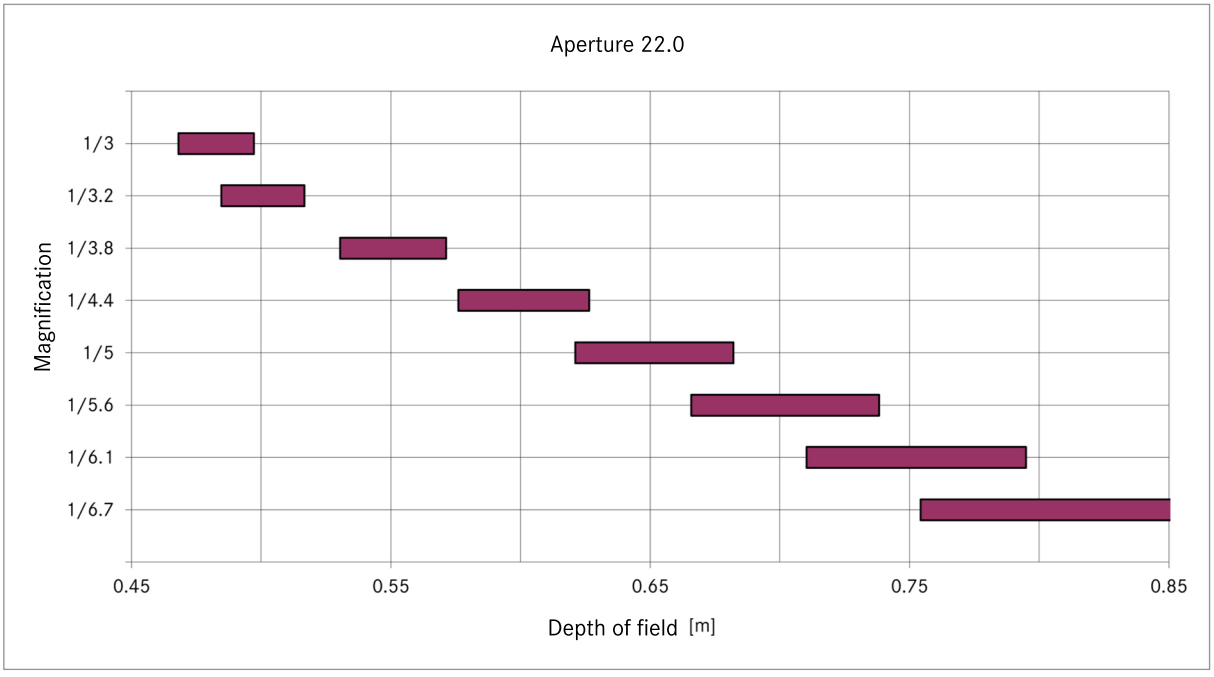
Depth of field table




Aperture 8.0
Magnification
1/3
1/3.2
1/3.8
1/4.4
1/5
1/5.6
1/6.1
1/6.7
0.45
0.55
0.65
0.75
0.85
Depth of field [m]


Aperture 11.0
Magnification
1/3
1/3.2
1/3.8
1/4.4
1/5
1/5.6
1/6.1
1/6.7
0.45
0.55
0.65
0.75
0.85
Depth of field [m]





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