

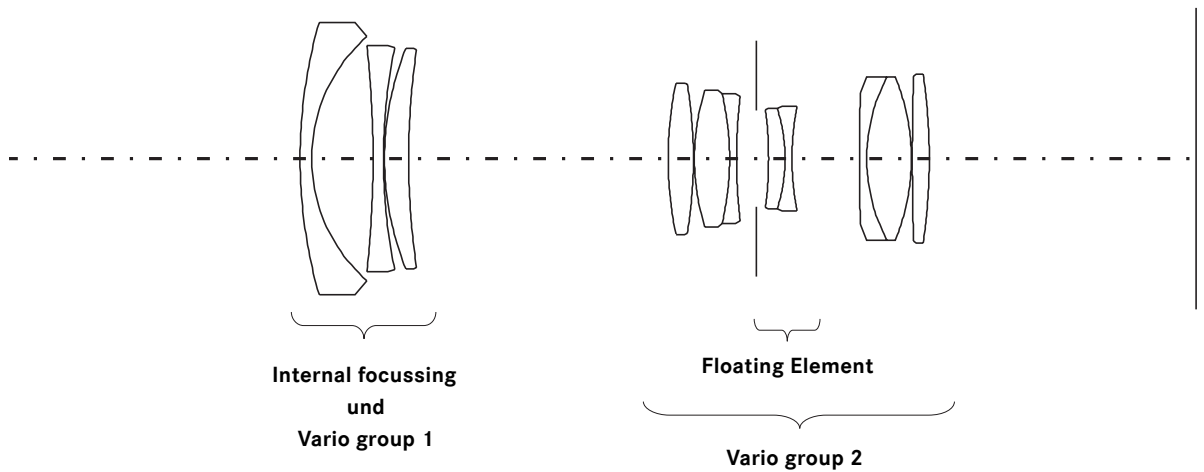


# LEICA VARIO-ELMAR-R 28-70 mm f/3.5-4.5



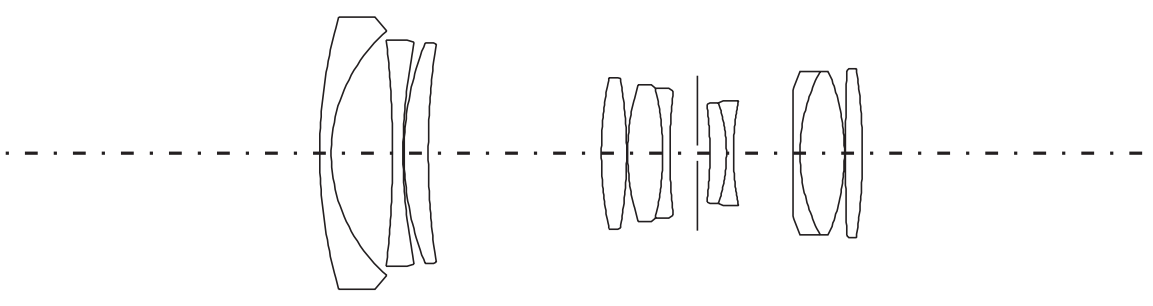
The special strengths of this zoom lens are a balanced imaging performance across the entire focusing range as well as good contrast rendition and detail reproduction already at full aperture. Focusing through the viewfinder is positive and fast. Stopping the lens down slightly by one or two aperture stops further enhances its excellent overall optical performance. Those who like to go on photo-graphic trips with as little baggage as possible will find this compact and handy lens with its expanded zoom range to be an ideal traveling companion.

— Lens shape 28 mm

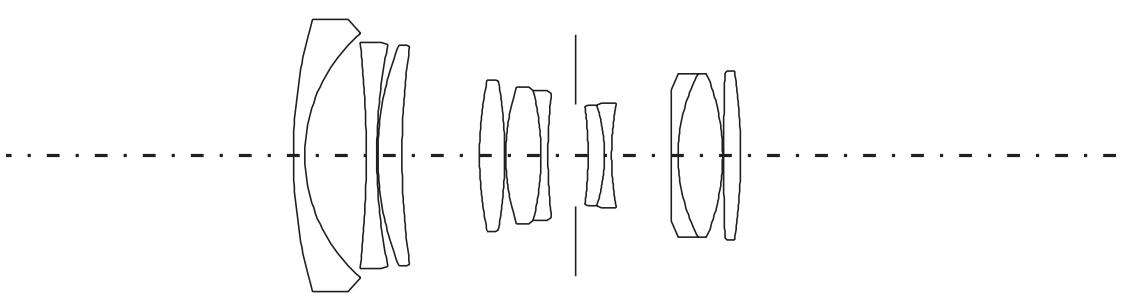




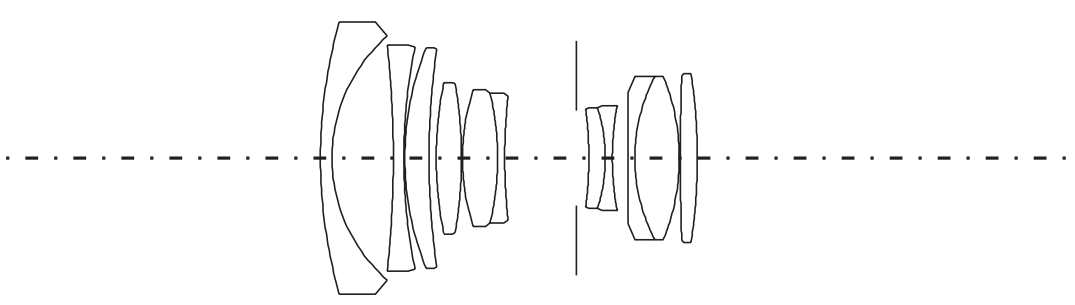
— Lens shape 35 mm



— Lens shape 50 mm



— Lens shape 70 mm





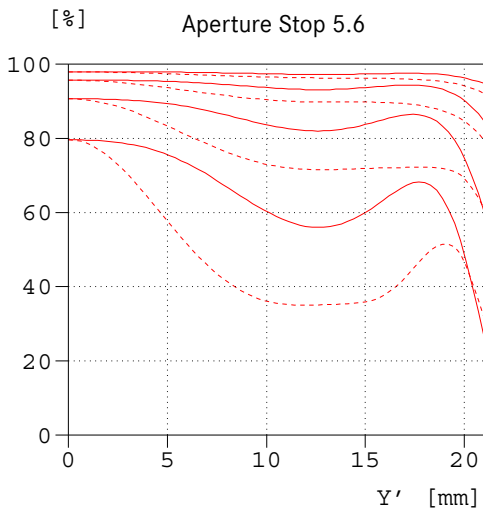
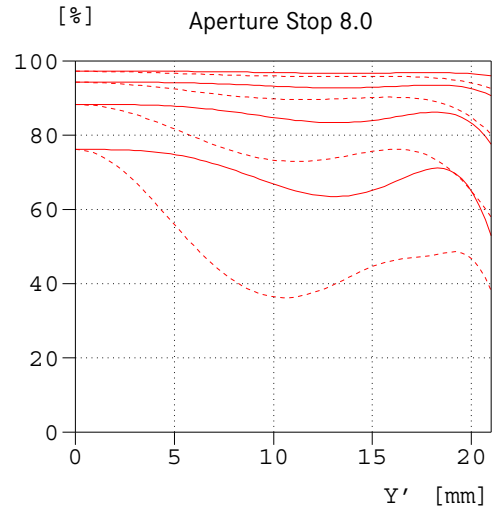
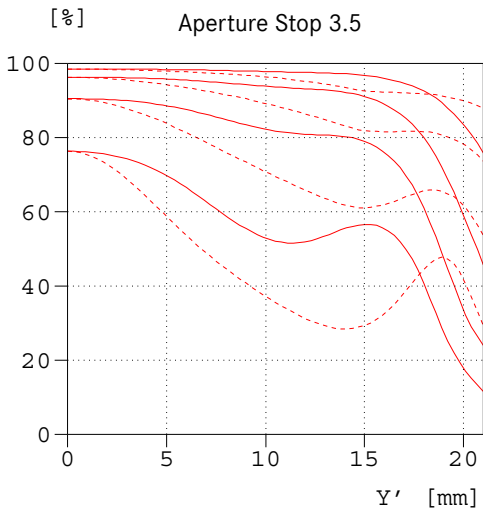
— Engineering drawing

### Technical Data

<b>Angle of view (diagonal, horizontal, vertical)</b>	Focal length 28 mm: 75°, 65°, 46° Focal length 70 mm: 34°, 29°, 19°
<b>Optical design</b>	<b>Number of elements / groups:</b> 11 / 8 <b>Focusing range:</b> 0.5 m to infinity
<b>Distance setting</b>	<b>Scale:</b> Combined meter/feet-increments <b>Smallest object field:</b> 28 mm focal length: 340 x 510 mm, 70 mm focal length: 150 x 225 mm <b>Highest reproduction ratio:</b> 28 mm focal length: 1:14.2, 70 mm focal length: 1:6.3
<b>Diaphragm</b>	<b>Setting / Type:</b> Preset diaphragm with clickstops (including half values), Fully automatic diaphragm <b>Smallest aperture:</b> f/22
<b>Bayonet</b>	LEICA R quick-change bayonet for LEICA R3 to LEICA R9 with mechanical, and, for LEICA R8/R9, additional electronic exposure control
<b>Filter (type)</b>	Internal thread for screw-in type filters E 60
<b>Lens hood</b>	Separate, screw-in type, also attachable in reverse position
<b>Dimensions and weight</b>	<b>Length:</b> ca. 76 mm <b>Largest diameter:</b> ca. 74 mm <b>Weight:</b> ca. 450 g



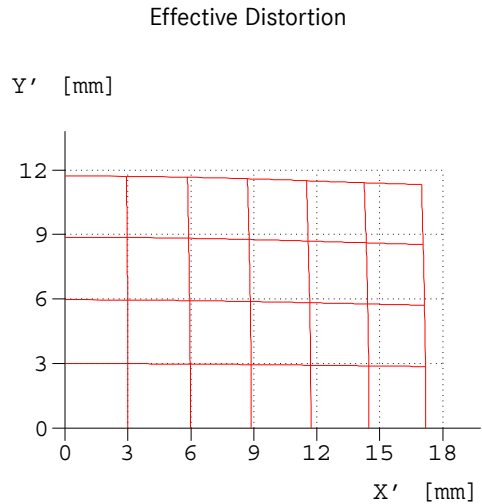
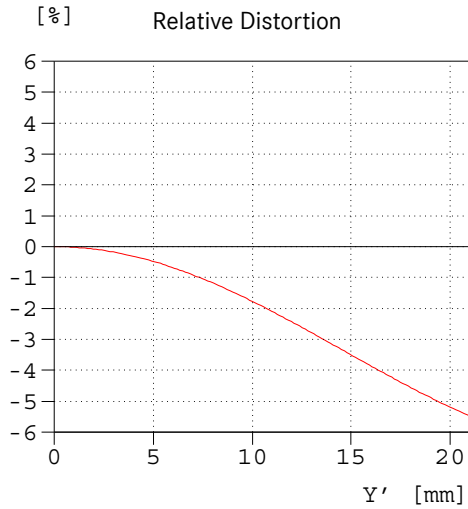
— MTF graphs 28 mm



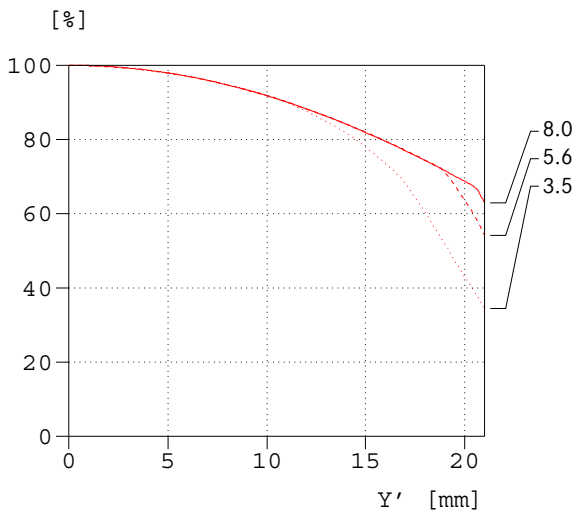
The MTF is indicated both at full aperture and at f/5.6 at long taking distances (infinity). Shown is the contrast in percentage for 5, 10, 20 and 40 lp/mm across the height of the 35 mm film format, for tangential (dotted line) and sagittal (solid line) structures, in white light. The 5 and 10 lp/mm 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 28 mm



— Vignetting 28 mm



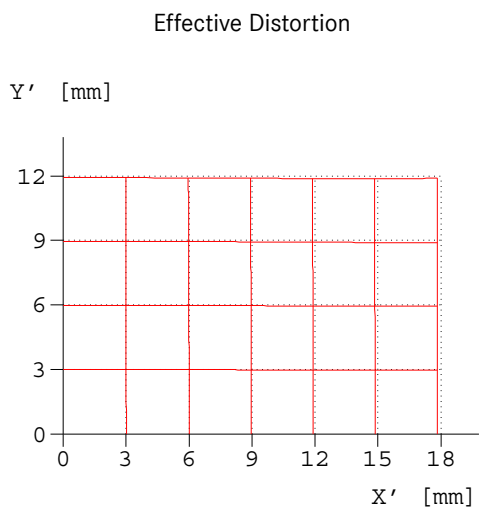
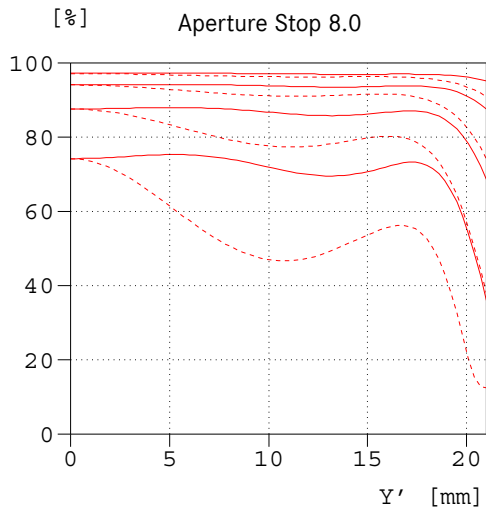
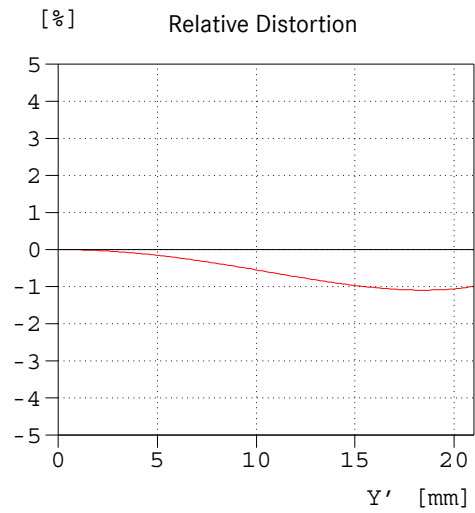
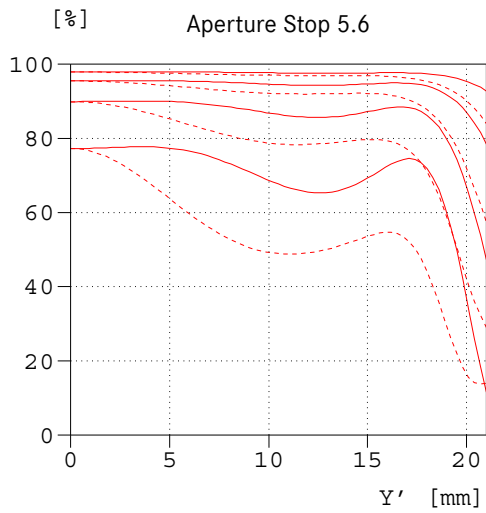
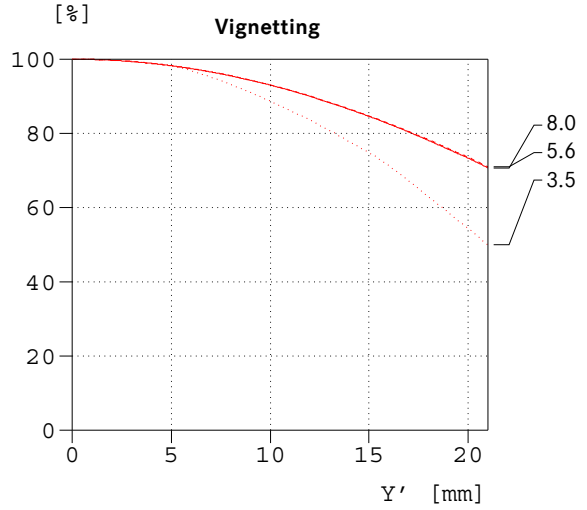
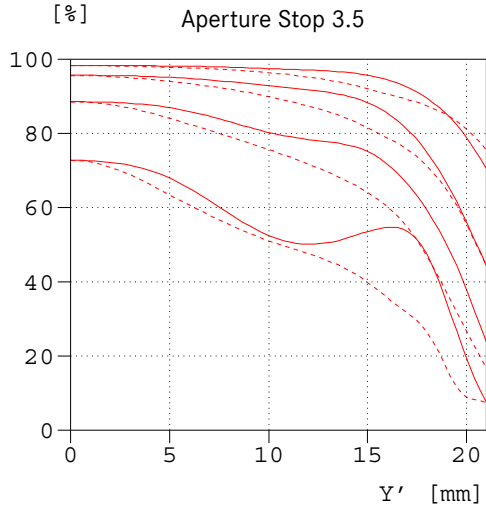
Distortion is the deviation of the real image height (in the picture) from the ideal image height. The relative distortion is the percentage deviation. The ideal image height results from the object height and the magnification. The image height of 21.6mm is the radial distance between the edge and the 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

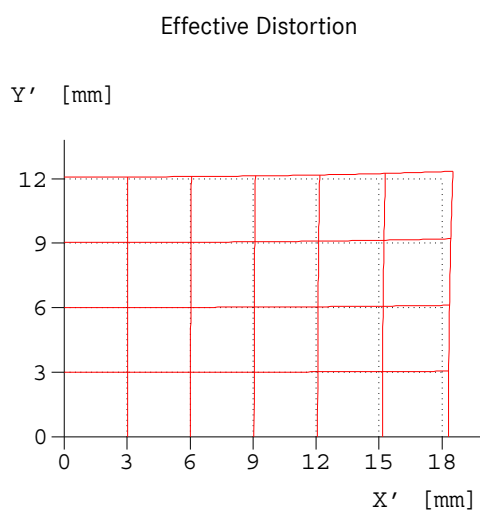
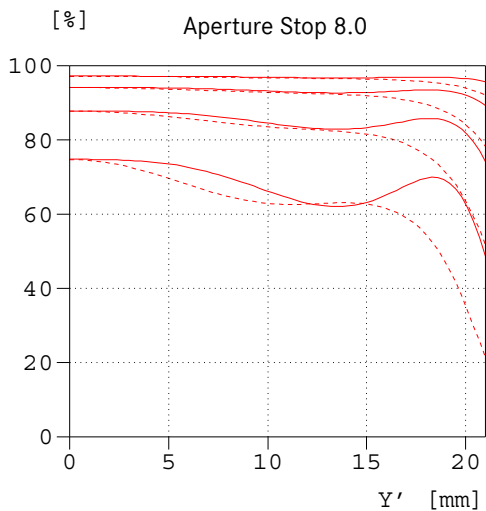
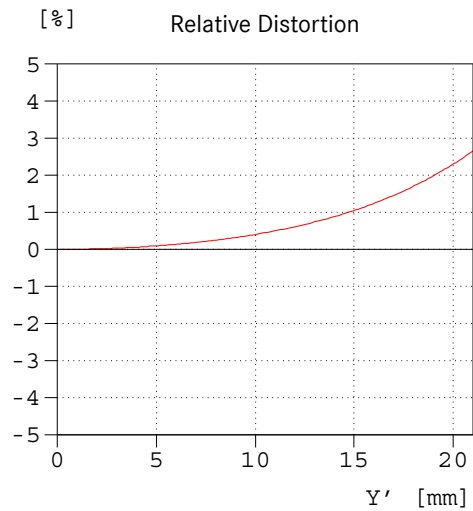
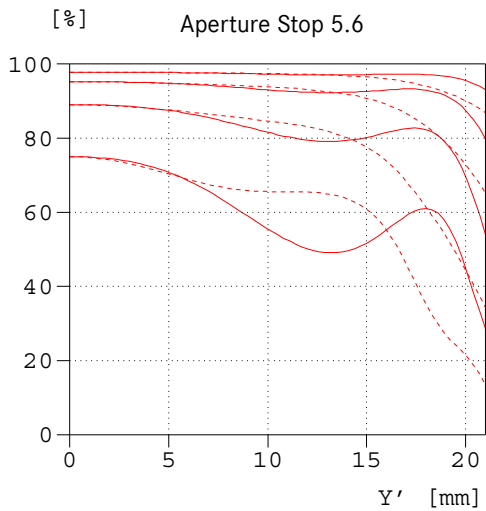
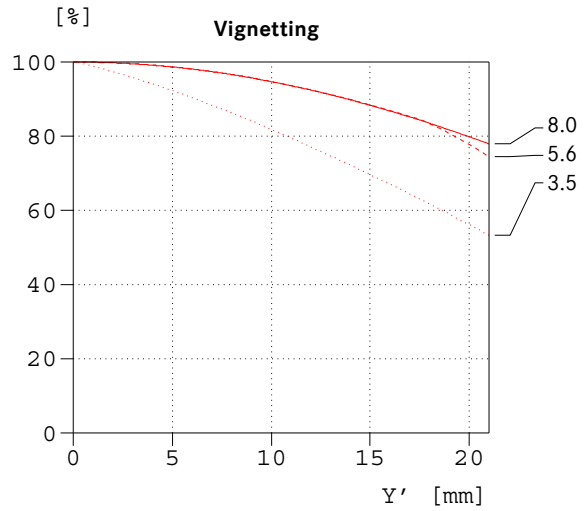
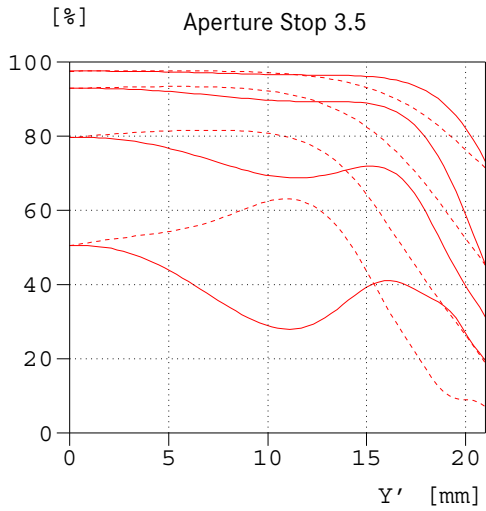


— 35 mm



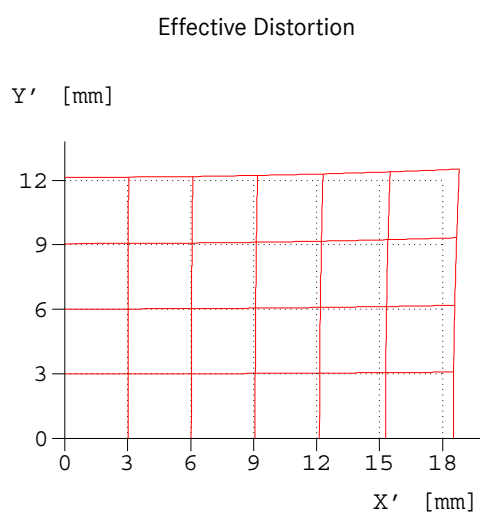
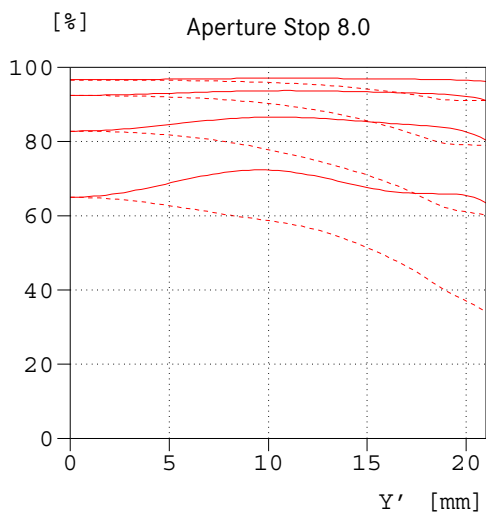
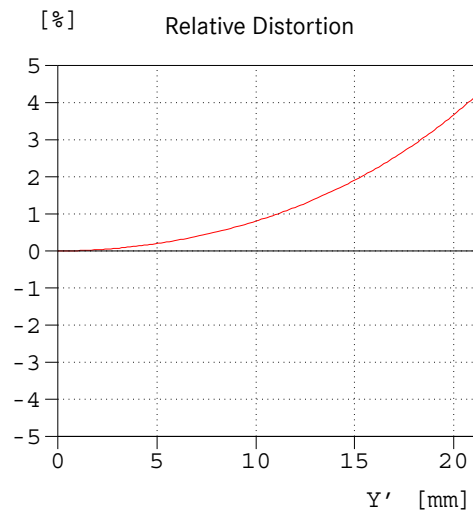
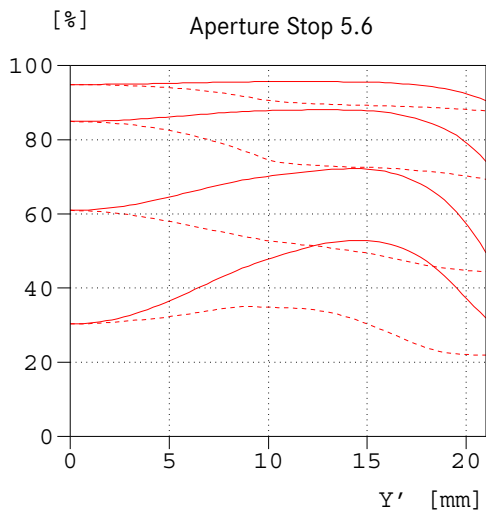
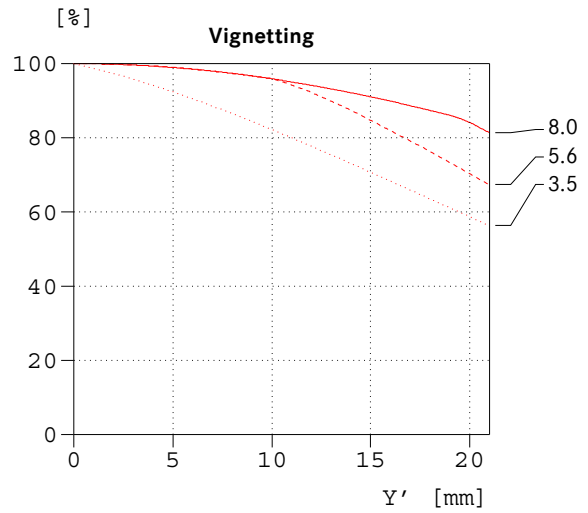
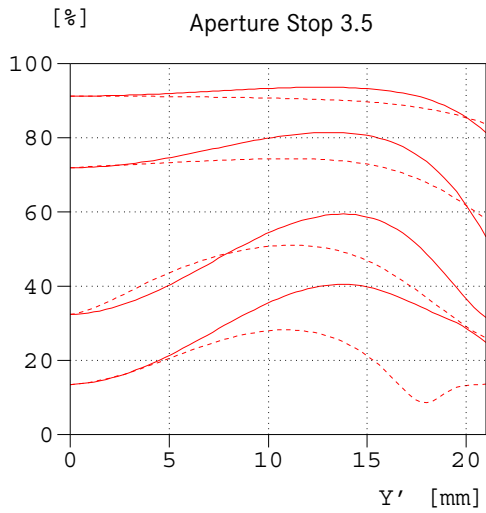


— 50 mm





— 70 mm

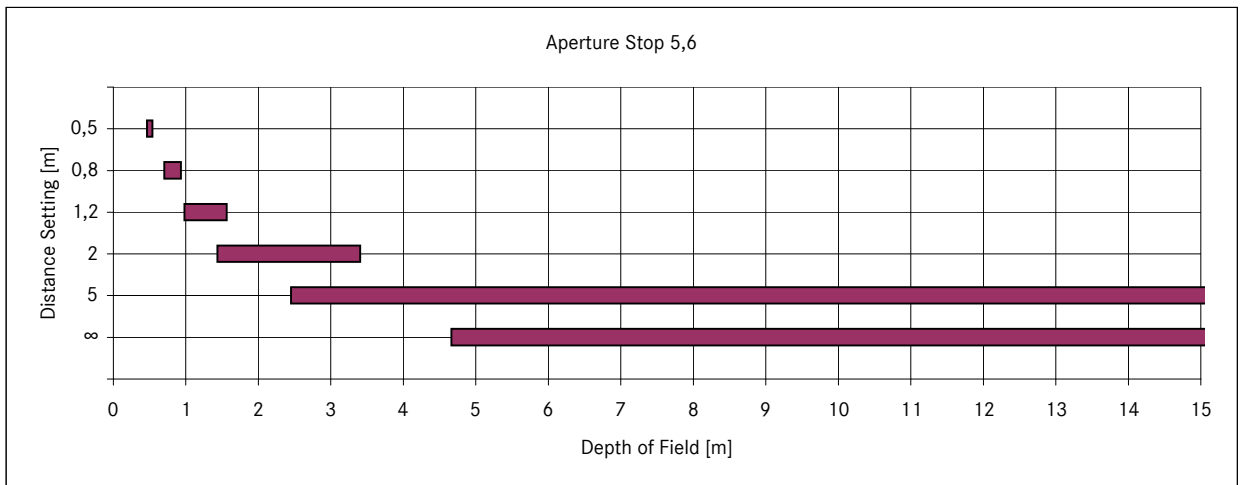
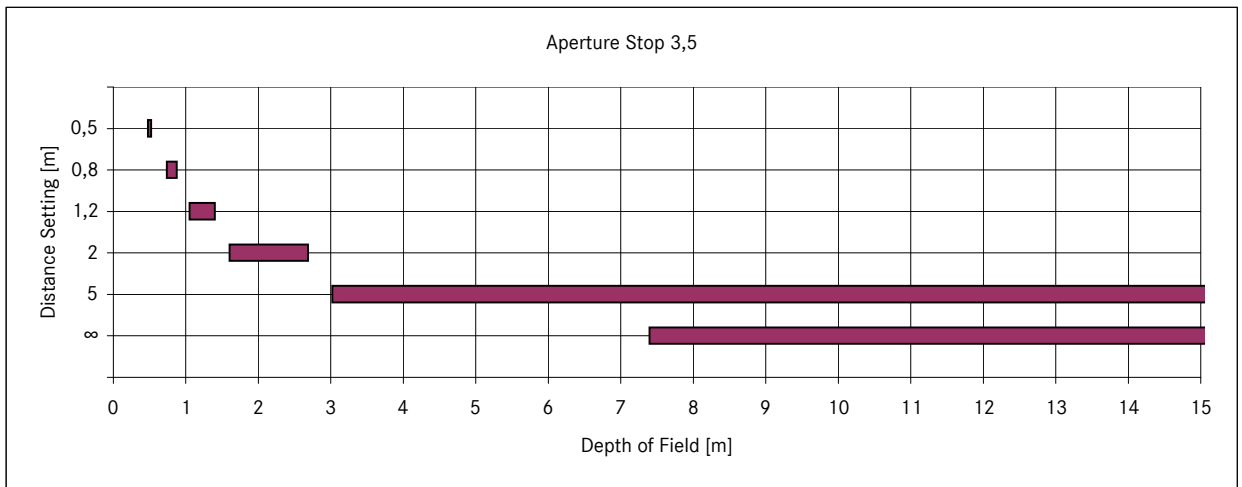


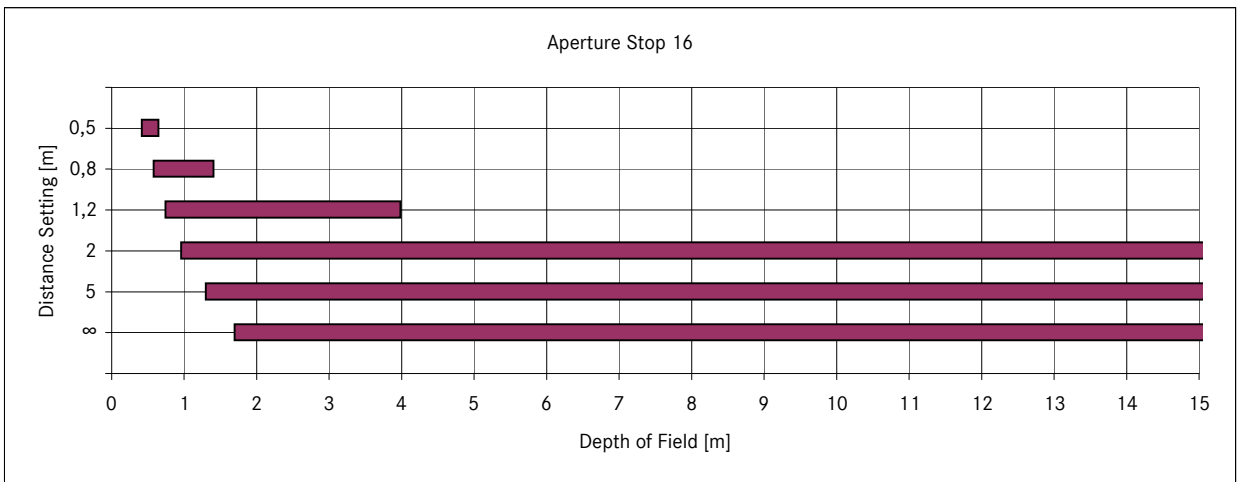
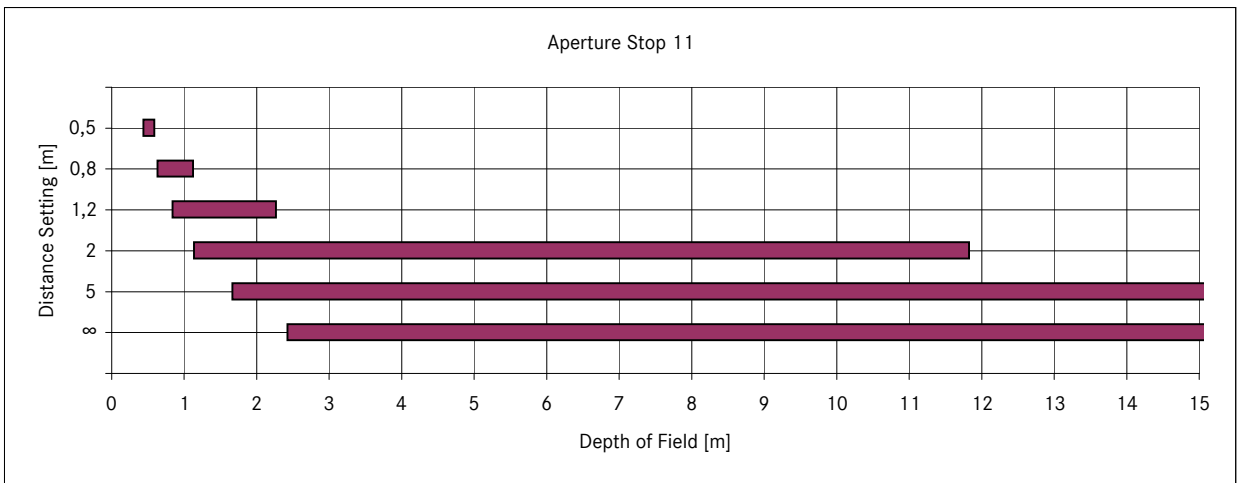
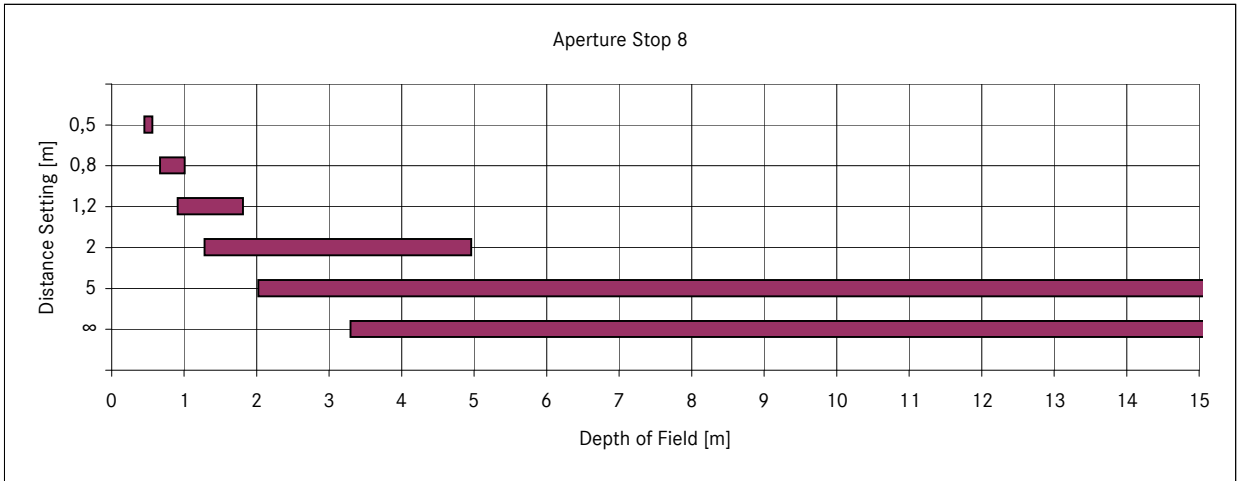


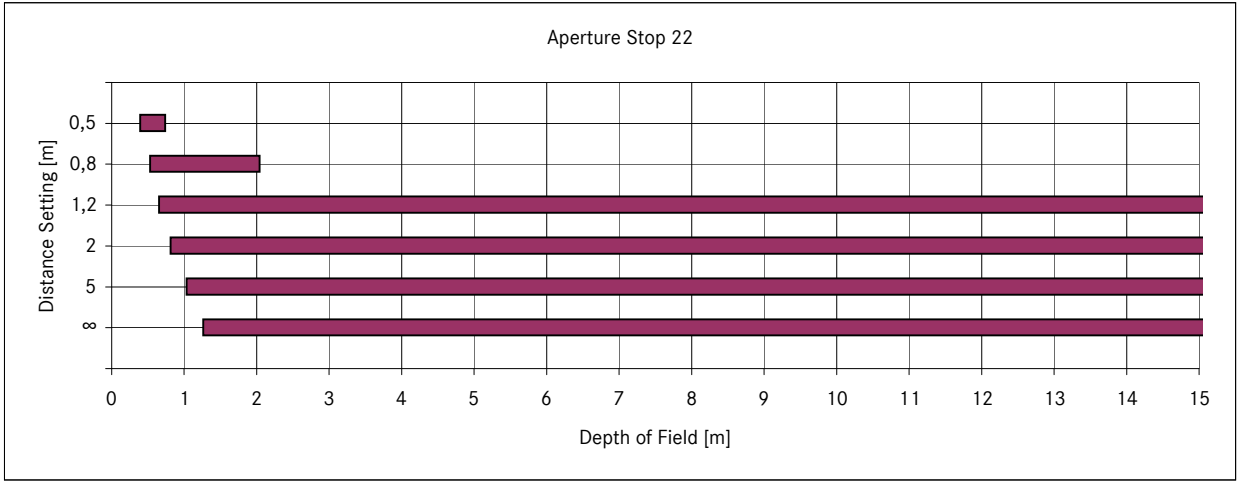


## — Depth of field table 28 mm

Distance Setting [m]	Aperture Stop						Magnification
	3,5	5,6	8	11	16	22	
0,5	0,477 - 0,525	0,465 - 0,542	0,452 - 0,563	0,437 - 0,593	0,414 - 0,651	0,391 - 0,743	1/14,2
0,8	0,736 - 0,879	0,702 - 0,936	0,668 - 1,012	0,631 - 1,128	0,579 - 1,408	0,528 - 2,044	1/24,6
1,2	1,051 - 1,404	0,980 - 1,568	0,910 - 1,814	0,838 - 2,268	0,742 - 3,987	0,655 - 82,21	1/38,4
2	1,601 - 2,690	1,433 - 3,411	1,281 - 4,962	1,135 - 11,830	0,957 - ∞	0,811 - ∞	1/66,0
5	3,022 - 15,29	2,452 - ∞	2,023 - ∞	1,666 - ∞	1,296 - ∞	1,032 - ∞	1/169
∞	7,398 - ∞	4,661 - ∞	3,292 - ∞	2,422 - ∞	1,696 - ∞	1,261 - ∞	1/∞



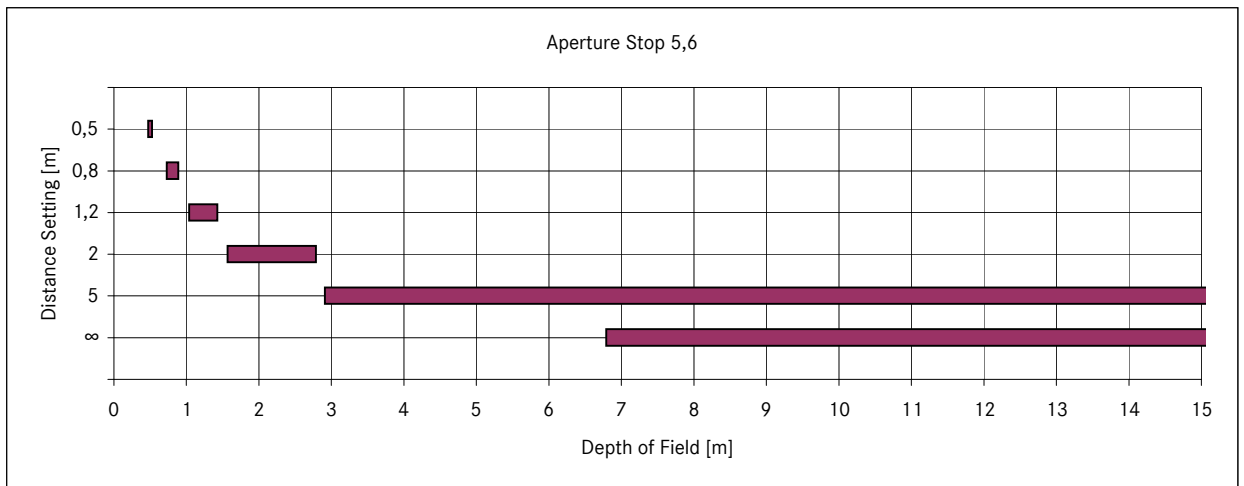
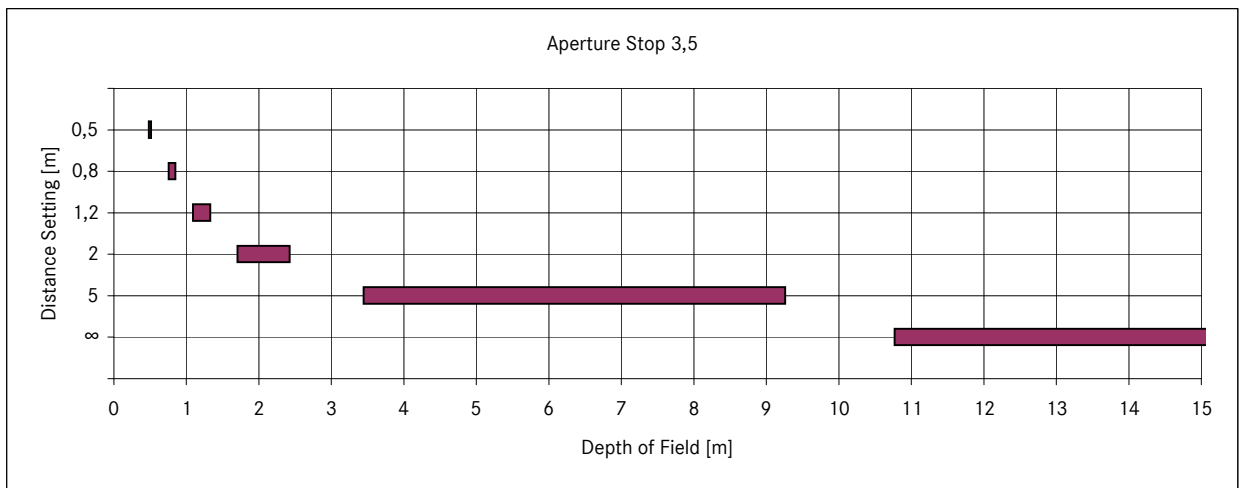


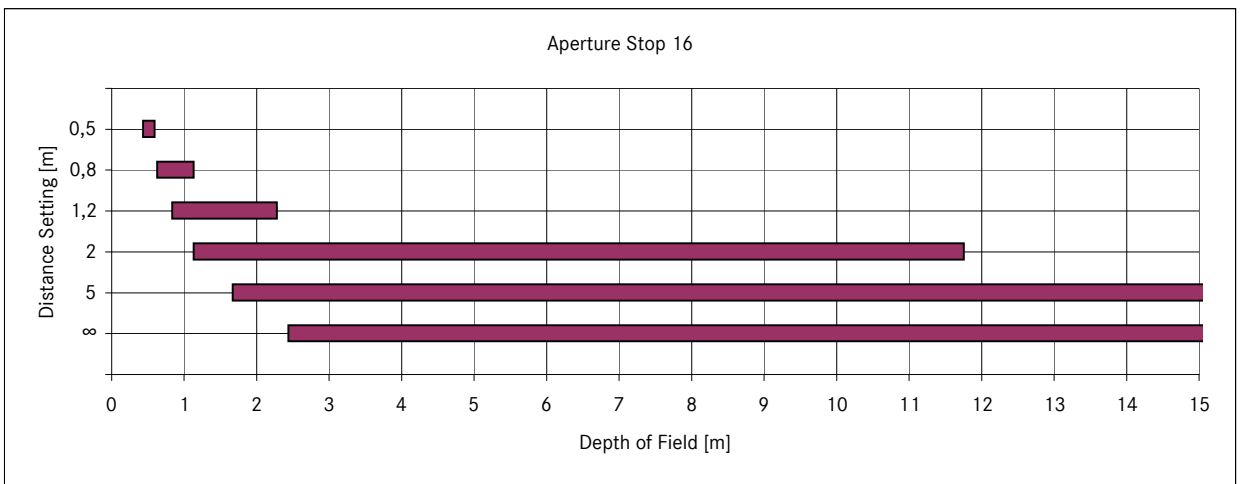
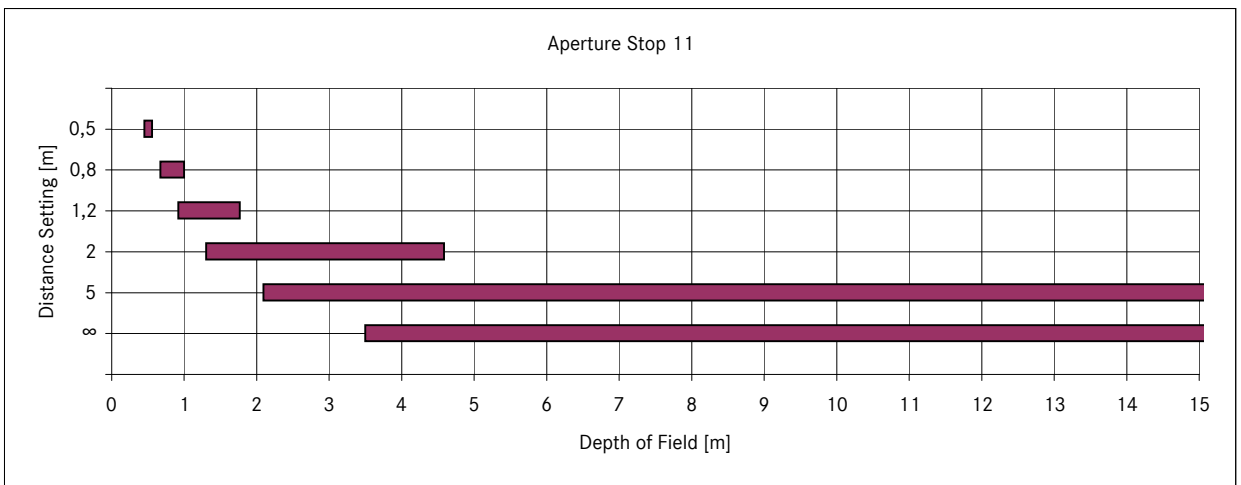
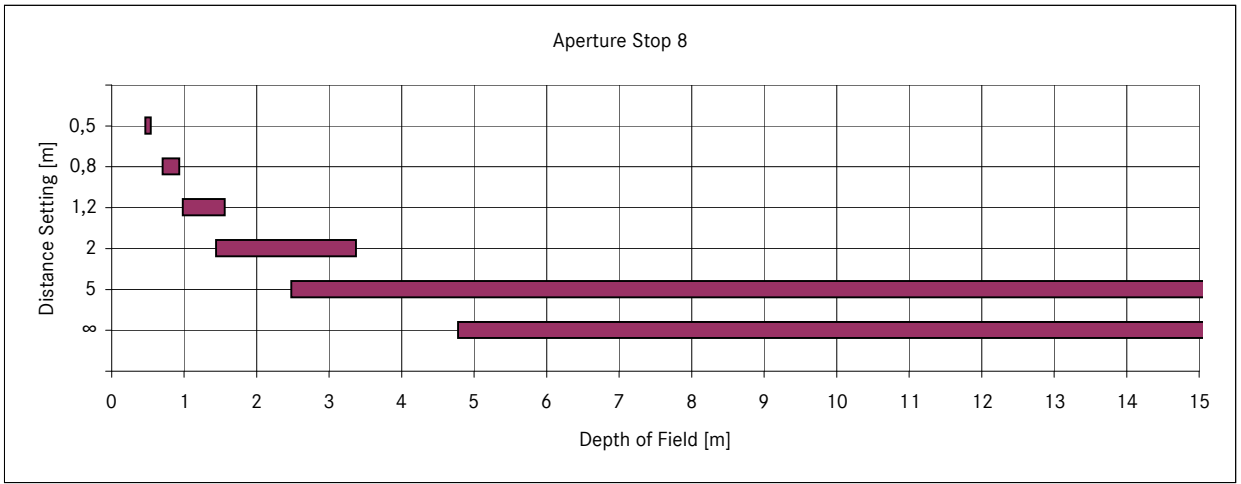


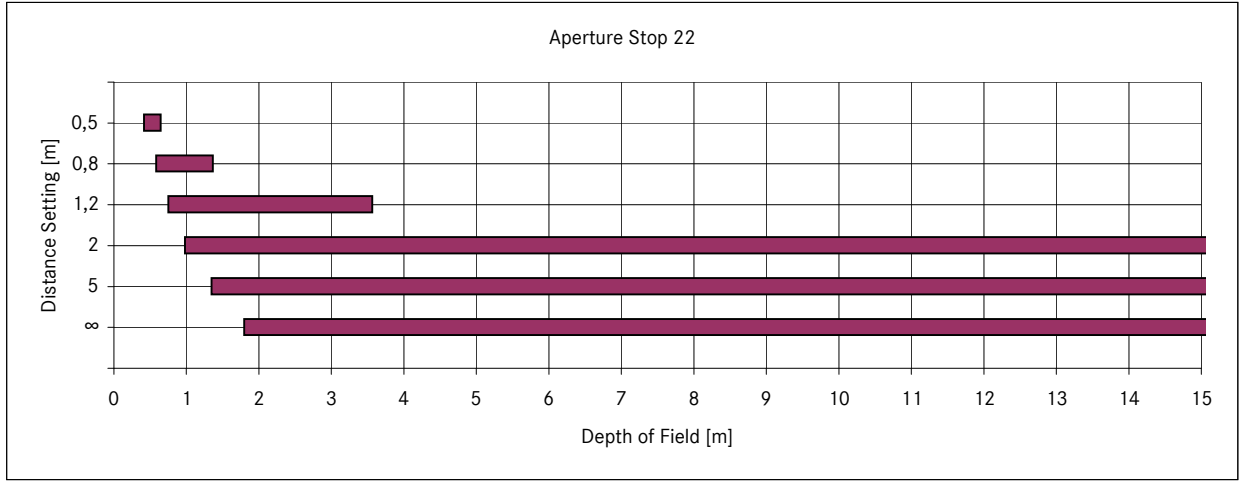


### Depth of field table 35 mm

Distance Setting [m]	Aperture Stop						Magnification
	3,5 (3,67)	5,6 (5,85)	8 (8,36)	11 (11,5)	16 (16,7)	22 (23,0)	
0,5	0,483 - 0,518	0,474 - 0,530	0,464 - 0,544	0,452 - 0,562	0,434 - 0,598	0,415 - 0,648	1/11,7
0,8	0,753 - 0,854	0,728 - 0,890	0,702 - 0,936	0,672 - 1,002	0,628 - 1,137	0,583 - 1,367	1/20,1
1,2	1,092 - 1,335	1,037 - 1,432	0,981 - 1,564	0,919 - 1,771	0,834 - 2,283	0,752 - 3,567	1/31,2
2	1,704 - 2,429	1,568 - 2,789	1,438 - 3,372	1,304 - 4,589	1,132 - 11,76	0,980 - ∞	1/53,5
5	3,443 - 9,263	2,912 - 19,05	2,476 - ∞	2,091 - ∞	1,668 - ∞	1,347 - ∞	1/137
∞	10,77 - ∞	6,790 - ∞	4,778 - ∞	3,499 - ∞	2,438 - ∞	1,796 - ∞	1/∞

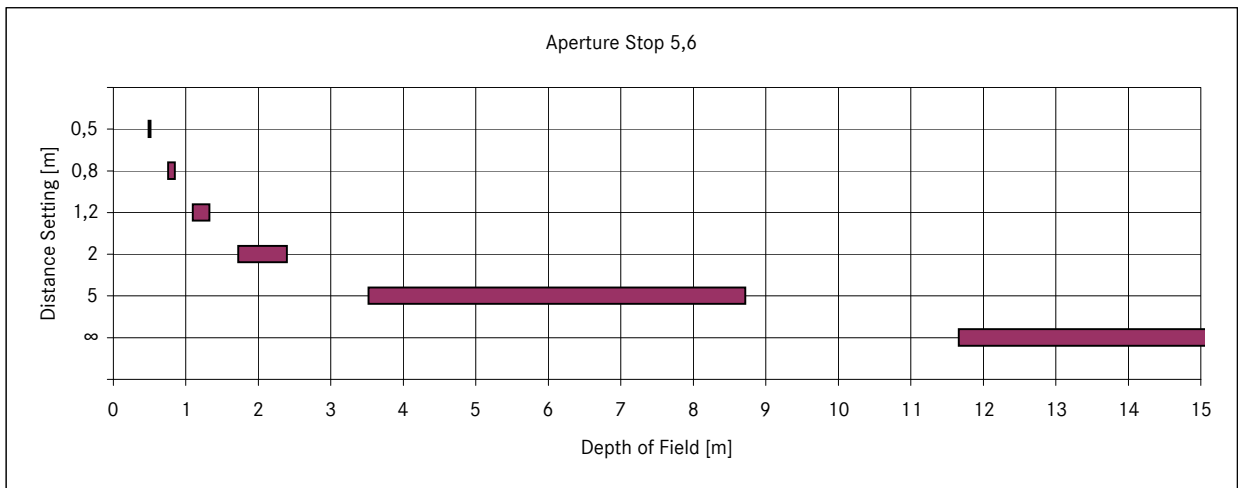
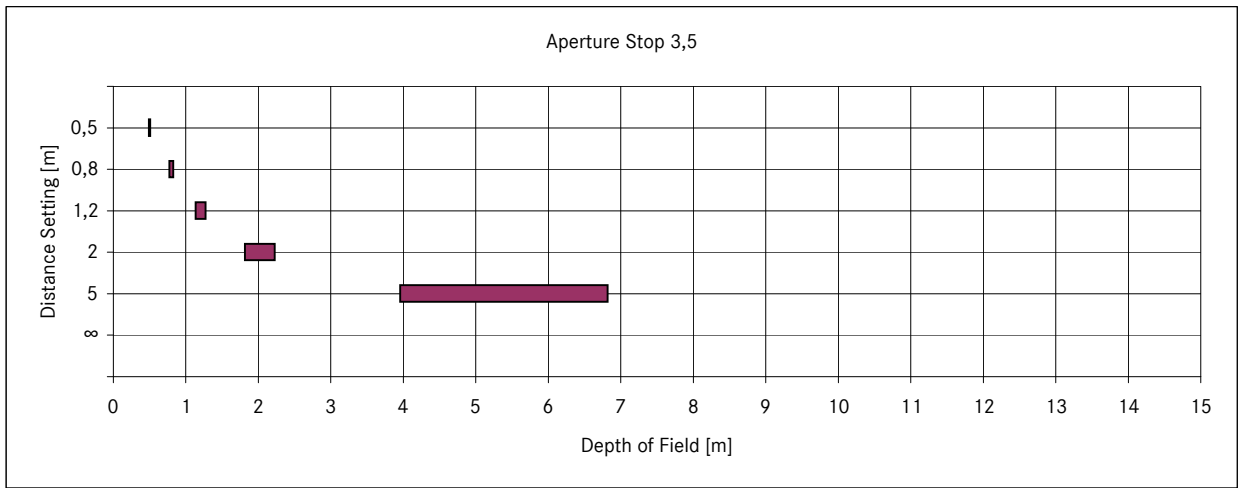


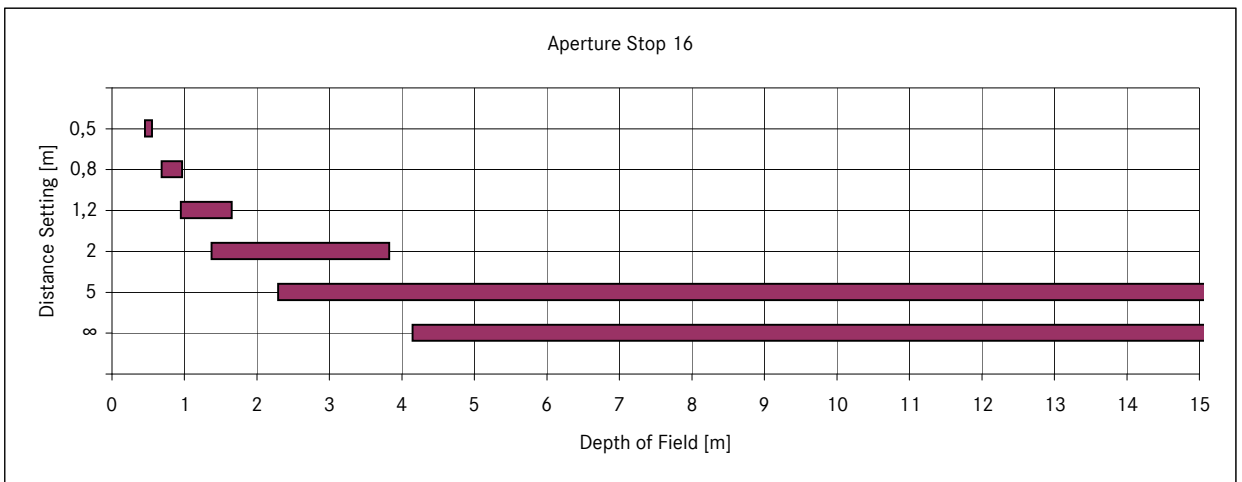
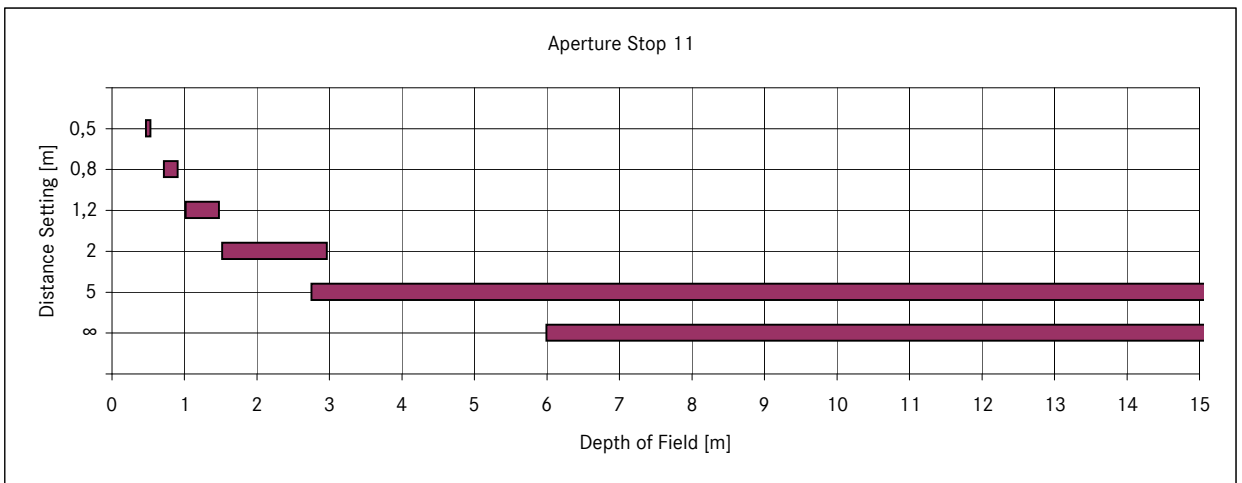
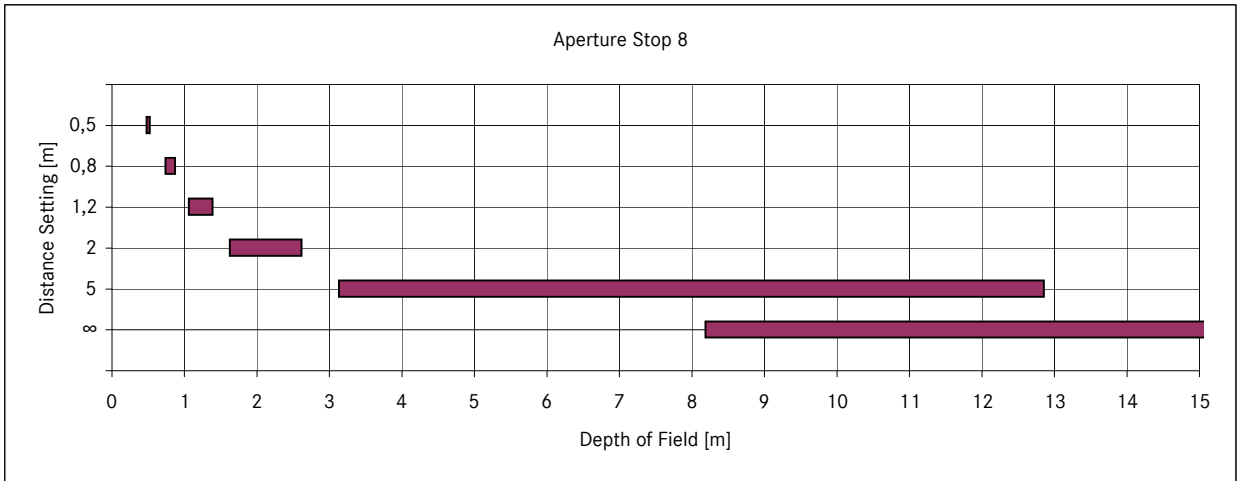




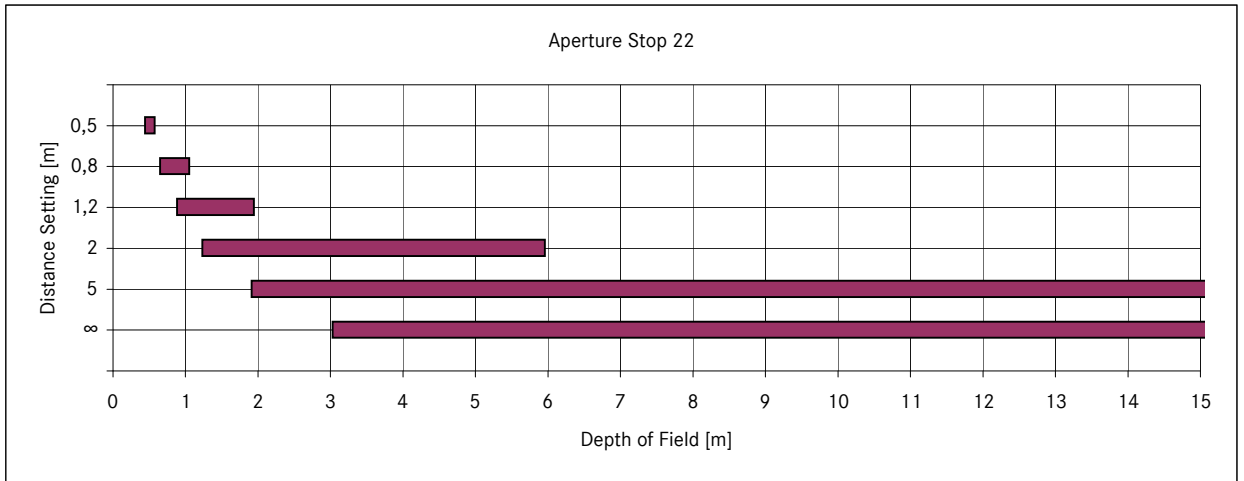


— Depth of field table 50 mm











### — Depth of field table 70 mm

Distance Setting [m]	Aperture Stop						Magnification
	3,5 (4,36)	5,6 (6,84)	8 (9,76)	11 (13,4)	16 (19,5)	22 (26,8)	
0,5	0,493 - 0,507	0,490 - 0,511	0,486 - 0,516	0,480 - 0,522	0,472 - 0,532	0,463 - 0,546	1/6,35
0,8	0,782 - 0,819	0,772 - 0,830	0,761 - 0,844	0,748 - 0,861	0,726 - 0,893	0,702 - 0,934	1/10,8
1,2	1,159 - 1,245	1,137 - 1,272	1,112 - 1,305	1,082 - 1,349	1,036 - 1,432	0,987 - 1,545	1/16,8
2	1,885 - 2,131	1,826 - 2,213	1,760 - 2,319	1,686 - 2,468	1,574 - 2,765	1,460 - 3,237	1/28,6
5	4,325 - 5,931	4,019 - 6,634	3,709 - 7,717	3,386 - 9,699	2,957 - 17,10	2,570 - 217,2	1/73,2
∞	31,58 - ∞	20,18 - ∞	14,17 - ∞	10,34 - ∞	7,131 - ∞	5,211 - ∞	1/∞

