

Optical Data



Instrument **Macroscope Leica Z16APO**

a) Visual Data

Objective Planapo 1.0x (10447176) Working Distance 97 mm
 Eyepiece 10x/21B (10445111)
 Tube Factor 1.25 (Y-Tube)

Zoom Position	Total Magnification	Field of View mm	numerical Aperture	Diameter Exit Pupil mm	Resolution lp/mm	Resolution μ m	Depth of Field* mm
0.57	7.13	29.5	0.017	1.19	51.	19.6	3.76
0.8	10.	21.	0.023	1.15	69.	14.5	2.
1.0	12.5	16.8	0.027	1.08	81.	12.3	1.38
1.6	20.	10.5	0.041	1.03	123.	8.13	0.578
2.0	25.	8.4	0.049	0.98	147.	6.8	0.392
2.5	31.3	6.72	0.058	0.93	174.	5.75	0.269
3.2	40.	5.25	0.069	0.86	207.	4.83	0.181
4.0	50.	4.2	0.079	0.79	237.	4.22	0.13
5.0	62.5	3.36	0.089	0.71	267.	3.75	0.096
6.3	78.8	2.67	0.099	0.63	297.	3.37	0.072
8.0	100.	2.1	0.107	0.54	321.	3.12	0.056
9.2	115.	1.83	0.112	0.49	336.	2.98	0.048

* after Berek

b) Digital Imaging

Camera Type Leica DC300
 Camera Adapter 0.5x
 Print Format 130 x 97 mm
 Printer Res. 1200 Dots per Inch
 Hardcopy Res. 150 Pixel per Inch

Zoom Position	Magnification Chip:Object	Field of View Projected onto the Chip mm x mm		Digital Resolution Lp/mm	Depth of Field* mm	Magnification Print:Object	Resolution Hardcopy* Lp/mm
0.57	0.356	19.8	14.8	25.8	1.52	6.55	19.4
0.8	0.5	14.1	10.5	36.2	0.82	9.2	27.2
1.0	0.625	11.3	8.42	45.3	0.582	11.5	34.
1.6	1.	7.07	5.26	72.5	0.248	18.4	54.3
2.0	1.25	5.65	4.21	90.6	0.171	23.	67.9
2.5	1.56	4.52	3.37	113.	0.12	28.7	84.9
3.2	2.	3.53	2.63	145.	0.083	36.8	109.
4.0	2.5	2.83	2.11	181.	0.062	46.	136.
5.0	3.13	2.26	1.68	226.	0.047	57.5	170.
6.3	3.94	1.79	1.34	285.	0.037	72.4	214.
8.0	5.	1.41	1.05	321.	0.03	92.	272.
9.2	5.75	1.23	0.916	336.	0.027	106.	312.

*estimated values

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 Tube Factor 1.25 (Y-Tube)

Zoom Position	Total Magnification	Field of View mm	numerical Aperture	Diameter Exit Pupil mm	Resolution lp/mm	Resolution μ m	Depth of Field* mm
0.57	14.3	14.7	0.034	1.19	102.	9.8	0.94
0.8	20.	10.5	0.046	1.15	138.	7.25	0.5
1.0	25.	8.4	0.054	1.08	162.	6.17	0.346
1.6	40.	5.25	0.082	1.03	246.	4.07	0.145
2.0	50.	4.2	0.098	0.98	294.	3.4	0.098
2.5	62.5	3.36	0.116	0.93	348.	2.87	0.067
3.2	80.	2.63	0.138	0.86	414.	2.42	0.045
4.0	100.	2.1	0.158	0.79	474.	2.11	0.033
5.0	125.	1.68	0.178	0.71	534.	1.87	0.024
6.3	158.	1.33	0.198	0.63	594.	1.68	0.018
8.0	200.	1.05	0.214	0.54	642.	1.56	0.014
9.2	230.	0.91	0.224	0.49	672.	1.49	0.012

* after Berek

b) Digital Imaging

Camera Type Leica DC300
 Camera Adapter 0.5x
 Print Format 130 x 97 mm
 Printer Res. 1200 Dots per Inch
 Hardcopy Res. 150 Pixel per Inch

Zoom Position	Magnification Chip:Object	Field of View Projected onto the Chip mm x mm		Digital Resolution Lp/mm	Depth of Field* mm	Magnification Print:Object	Resolution Hardcopy* Lp/mm
0.57	0.713	9.92	7.39	51.6	0.38	13.1	38.7
0.8	1.	7.07	5.26	72.5	0.205	18.4	54.3
1.0	1.25	5.65	4.21	90.6	0.145	23.	67.9
1.6	2.	3.53	2.63	145.	0.062	36.8	109.
2.0	2.5	2.83	2.11	181.	0.043	46.	136.
2.5	3.13	2.26	1.68	226.	0.03	57.5	170.
3.2	4.	1.77	1.32	290.	0.021	73.6	217.
4.0	5.	1.41	1.05	362.	0.015	92.	272.
5.0	6.25	1.13	0.842	453.	0.012	115.	340.
6.3	7.88	0.897	0.669	571.	0.009	145.	428.
8.0	10.	0.707	0.526	642.	0.008	184.	543.
9.2	11.5	0.614	0.458	672.	0.007	212.	625.

*estimated values

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 Tube Factor 1.25 (Y-Tube)

Zoom Position	Total Magnification	Field of View mm	numerical Aperture	Diameter Exit Pupil mm	Resolution lp/mm	Resolution μm	Depth of Field* mm
0.57	14.3	14.7	0.04	1.4	120.	8.33	0.768
0.8	20.	10.5	0.0579	1.45	174.	5.75	0.375
1.0	25.	8.4	0.0716	1.43	215.	4.66	0.244
1.25	31.3	6.72	0.0893	1.43	268.	3.73	0.156
1.6	40.	5.25	0.113	1.41	339.	2.95	0.097
2.0	50.	4.2	0.144	1.44	432.	2.32	0.061
2.5	62.5	3.36	0.18	1.44	540.	1.85	0.039
3.2	80.	2.63	0.222	1.39	666.	1.5	0.025
3.6	90.	2.33	0.234	1.3	702.	1.42	0.021

* after Berek

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 Print Format 130 x 97 mm
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 Hardcopy Res. 150 Pixel per Inch

Zoom Position	Magnification Chip:Object	Field of View Projected onto the Chip mm x mm		Digital Resolution Lp/mm	Depth of Field* mm	Magnification Print:Object	Resolution Hardcopy* Lp/mm
0.57	0.713	9.92	7.39	51.6	0.293	13.1	38.7
0.8	1.	7.07	5.26	72.5	0.142	18.4	54.3
1.0	1.25	5.65	4.21	90.6	0.092	23.	67.9
1.25	1.56	4.52	3.37	113.	0.059	28.7	84.9
1.6	2.	3.53	2.63	145.	0.037	36.8	109.
2.0	2.5	2.83	2.11	181.	0.023	46.	136.
2.5	3.13	2.26	1.68	226.	0.015	57.5	170.
3.2	4.	1.77	1.32	290.	0.009	73.6	217.
3.6	4.5	1.57	1.17	326.	0.008	82.8	244.

*estimated values

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Zoom Position	Total Magnification	Field of View mm	numerical Aperture	Diameter Exit Pupil mm	Resolution lp/mm	Resolution μ m	Depth of Field* mm
0.57	7.13	29.5	0.02	1.4	60.	16.7	3.07
0.8	10.	21.	0.029	1.45	86.9	11.5	1.5
1.0	12.5	16.8	0.0358	1.43	107.	9.31	0.974
1.25	15.6	13.4	0.0446	1.43	134.	7.47	0.626
1.6	20.	10.5	0.0566	1.41	170.	5.89	0.386
2.0	25.	8.4	0.072	1.44	216.	4.63	0.242
2.5	31.3	6.72	0.09	1.44	270.	3.7	0.155
3.2	40.	5.25	0.111	1.39	333.	3.	0.099
3.6	45.	4.67	0.117	1.3	351.	2.85	0.085

* after Berek

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Zoom Position	Magnification Chip:Object	Field of View Projected onto the Chip mm x mm		Digital Resolution Lp/mm	Depth of Field* mm	Magnification Print:Object	Resolution Hardcopy* Lp/mm
0.57	0.356	19.8	14.8	25.8	1.17	6.55	19.4
0.8	0.5	14.1	10.5	36.2	0.566	9.2	27.2
1.0	0.625	11.3	8.42	45.3	0.369	11.5	34.
1.25	0.781	9.04	6.74	56.6	0.237	14.4	42.4
1.6	1.	7.07	5.26	72.5	0.147	18.4	54.3
2.0	1.25	5.65	4.21	90.6	0.091	23.	67.9
2.5	1.56	4.52	3.37	113.	0.058	28.7	84.9
3.2	2.	3.53	2.63	145.	0.038	36.8	109.
3.6	2.25	3.14	2.34	163.	0.033	41.4	122.

*estimated values