

Typical objectives installed on Zeiss fluorescence microscopes. For a list of all objectives available, please visit:

<https://www.janelia.org/support-team/light-microscopy/resources>

Objectives	Magnification	N.A.	Immersion Type	Working Distance (mm)	r_{xy} = Lateral Resolution (μm)			r_z = Axial Resolution (μm)		
					Conventional	Confocal (PH<0.25AU)	Confocal (PH>1AU)	Conventional	Confocal (PH<0.25AU)	Confocal (PH>1AU)
Plan-Apochromat 5x/0.16 M27 420630-9900	5x	0.16	Air	12.1	1.94	1.15	1.56	39.77	24.92	33.74
EC Plan-Neofluar 10x/0.3 M27 420340-9901	10x	0.3	Air	5.2	1.03	0.61	0.83	11.31	7.09	9.60
Plan-Apochromat 10x/0.45 M27 420640-9900/9901	10x	0.45	Air	2	0.69	0.41	0.55	5.03	3.15	4.27
Plan-Apochromat 20x/0.8 M27 420650-9901	20x	0.8	Air	0.55	0.39	0.23	0.31	1.27	0.80	1.07
W Plan-Apochromat 20x/1.0 DIC M27 75mm 421452-9800	20x	1	Water-dipping	1.8	0.31	0.18	0.25	1.35	0.70	0.95
LD LCI Plan-Apochromat 25x/0.8 Imm Corr DIC M27 420852-9870/9871	25x	0.8	Water, Gly, Oil	0.57 @#1.5	0.39	0.23	0.31	1.69, 1.87, 1.93	1.19, 1.35, 1.40	1.61, 1.82, 1.88
EC Plan-Neofluar 40x/1.30 Oil DIC M27 420462-9900	40x	1.3	Oil	0.21	0.24	0.14	0.19	1.19	0.43	0.58
Plan-Apochromat 40x/0.95 Corr M27 420661-9970	40x	0.95	Air	0.25	0.33	0.19	0.26	1.07	0.46	0.62
Plan-Apochromat 40x/1.3 Oil DIC M27 420762-9800-799	40x	1.3	Oil	0.21	0.24	0.14	0.19	1.19	0.43	0.58
W Plan-Apochromat 40x/1.0 DIC M27 421462-9900	40x	1	Water-dipping	2.5	0.31	0.18	0.25	1.35	0.70	0.95
C-Apochromat 40x/1.2 W Corr M27 421767-9970/9971	40x	1.2	Water	0.28 @#1.5	0.26	0.15	0.21	1.13	0.42	0.57
Plan-Apochromat 63x/1.4 Oil DIC M27 420782-9900/9900-799	63x	1.4	Oil	0.19	0.22	0.13	0.18	1.10	0.34	0.46
Plan-Apochromat 100x/1.40 Oil DIC M27 420792-9900	100x	1.4	Oil	0.17	0.22	0.13	0.18	1.10	0.34	0.46

N.A. = Numerical Aperture
 PH = Pinhole Diameter
 n = Refractive Index
 λ_{exc} = Excitation Wavelength (488 nm)
 λ_{em} = Emission Wavelength (510 nm)
 $\bar{\lambda} = \sqrt{\lambda_{exc}\lambda_{em}}$

Recommended pixel size = $r_{xy}/2.3$

$$r_{xy} = \frac{0.61\lambda_{em}}{NA}$$

$$r_{xy}(PH < 0.25AU) = \frac{0.37\bar{\lambda}}{NA}$$

$$r_{xy}(PH > 1AU) = \frac{0.51\lambda_{exc}}{NA}$$

$$r_z = \frac{2n\lambda_{em}}{NA^2}$$

$$r_z(PH < 0.25AU) = \begin{cases} \text{for } NA \geq 0.5 & \frac{0.64\bar{\lambda}}{n - \sqrt{n^2 - NA^2}} \\ \text{for } NA < 0.5 & \frac{1.28n\bar{\lambda}}{NA^2} \end{cases}$$

$$r_z(PH > 1AU) = \begin{cases} \text{for } NA \geq 0.5 & \frac{0.88\lambda_{exc}}{n - \sqrt{n^2 - NA^2}} \\ \text{for } NA < 0.5 & \frac{1.77n\lambda_{exc}}{NA^2} \end{cases}$$