

Cell imaging

EVOS objectives

We offer a comprehensive portfolio of objectives for Invitrogen™ EVOS™ imaging systems to suit your needs. All Invitrogen™ EVOS™ objectives offer outstanding optical performance from visible light to near-infrared light. The extensive choice of objectives satisfies needs across the spectra of magnifications and optical specifications.



Objective type	Achromat	Fluorite	Semi-apochromat	Apochromat
Recommended applications	Designed for general applications. Color and focus have standard correction compared to apochromat and fluorite objectives.	Designed for fluorescence and demanding transmitted-light applications. They provide excellent resolution, resulting in bright fluorescence signal and high-contrast imaging.	Designed for all fluorescence applications, with only slightly lower image quality than apochromat objectives. They are a more affordable alternative to apochromat while still delivering excellent image quality compared to most other fluorite objectives.	Designed for the most demanding applications, especially capturing color images in white light. They provide exceptional resolution, fluorescence brightness, contrast, and chromatic correction compared to achromat and fluorite objectives.
Color/brightfield	Yes			
Coverslip	No	Yes		
Plastic	Yes		Lower magnification only	
Fluorescence	No	Yes, good image quality	Yes, better image quality	Yes, best image quality

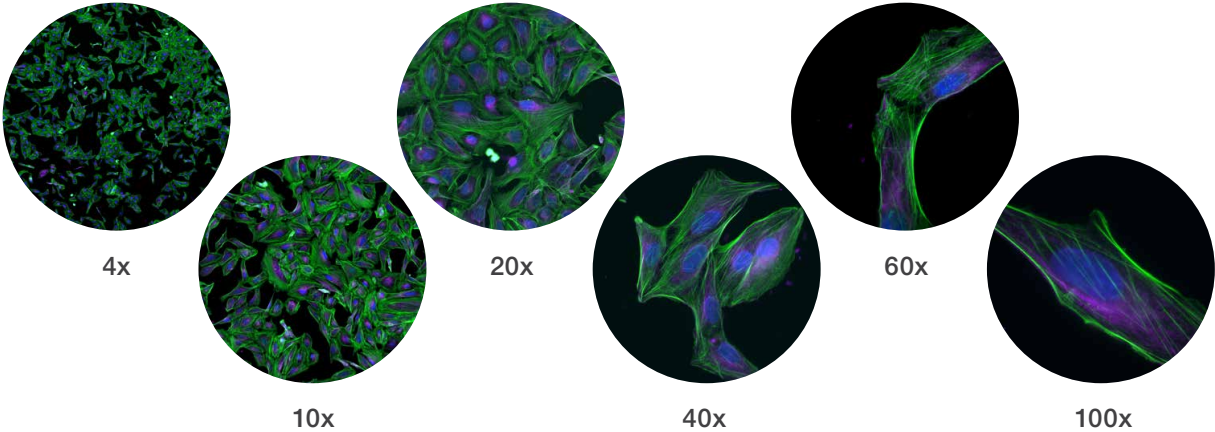


Figure 1. U-2 OS cells with stained nuclei (blue), actin (green), and alpha tubulin (purple) were imaged with an Invitrogen™ EVOS™ M7000 Imaging System equipped with Invitrogen™ EVOS™ Light Cubes for DAPI, Invitrogen™ Alexa Fluor™ 488, and Invitrogen™ Cy®5 dyes and objectives ranging from 2x to 100x.

Key terms for objectives

Numerical aperture (NA)

An objective's NA is a measure of its ability to gather light. Objectives with higher NA at the same magnification will generally produce higher quality images, especially for samples with weak fluorescence signals.

Long working distance (LWD) objectives

Optimized for use through vessels with nominal wall thickness of 0.9–1.5 mm (e.g., slides, flasks, microtiter dishes).

Coverslip-corrected (CC) objectives

Optimized for use through No. 1.5 coverslips (approximately 0.17 mm thick). Have a higher magnification-to-NA ratio and provide higher resolution than long working distance objectives.

Working distance (WD)

The distance from the front lens element of the objective to the closest surface of the coverslip when the specimen is in sharp focus.

Objective starter kits

For those who need objectives that can reliably perform the most basic applications, these bundles were made to simplify the objective selection process. The first bundle is great for cell imaging workflows with nonfluorescent samples, while the second contains objectives optimized for fluorescence and transmitted light imaging.

Invitrogen™ EVOS™ Objective Starter Kit for Brightfield/Phase Contrast (Cat. No. AMEP5009)											
Magnification	NA	WD (mm)	Brightfield	Phase	Fluorescence	LWD*	CC	Optimal vessel thickness (mm)	Oil	Brand	Cat. No.
4x	0.13	10.58	•			•		1		EVOS	AMEP4932
10x	0.25	7.45	•	•		•		1		EVOS	AMEP4933
20x	0.40	6.92	•	•		•		1		EVOS	AMEP4934

Invitrogen™ EVOS™ Objective Starter Kit for Fluorescence/Brightfield/Phase Contrast (Cat. No. AMEP5010)											
Magnification	NA	WD (mm)	Brightfield	Phase	Fluorescence	LWD*	CC	Optimal vessel thickness (mm)	Oil	Brand	Cat. No.
4x	0.13	10.58	•	•	•	•		1		EVOS	AMEP4980
10x	0.25	7.13	•	•	•	•		1		EVOS	AMEP4981
20x	0.45	6.12	•	•	•	•		1		EVOS	AMEP4982

* Recommend 1.0 mm thickness for glass slides.

Achromat objectives

Achromat objectives are ideal for general applications. Color and focus have standard correction compared to apochromat and fluorite objectives. This table includes LWD objectives that are optimized for the imaging of slides, cell culture dishes and flasks, and microtiter plates, as well as CC options.

Achromat											
Magnification	NA	WD (mm)	Brightfield	Phase	Fluorescence	LWD*	CC	Optimal vessel thickness (mm)	Oil	Brand	Cat. No.
2x	0.06	5.62	•			•		1		EVOS	AMEP4631
4x	0.13	10.58	•	•		•		1		EVOS	AMEP4632
10x	0.25	7.45	•	•		•		1		EVOS	AMEP4633
20x	0.40	6.92	•	•		•		1		EVOS	AMEP4634
40x	0.65	3.10	•	•		•		1.2		EVOS	AMEP4635
	0.65	2.74	•	•		•		1		EVOS	AMEP4935
50x	0.95	0.19	•				•	0.17	•	EVOS	AMPFOP050
100x	1.25	0.17	•				•	0.17	•	EVOS	AMPFOP100

* Recommend 1.0 mm thickness for glass slides.

Fluorite objectives

Fluorite objectives are ideal for fluorescence and demanding transmitted-light applications. They provide excellent resolution, resulting in bright fluorescence signal and high-contrast imaging. Fluorite objectives help reduce optical aberrations. Color and focus have a higher level of correction than with other objectives. This table includes LWD objectives that are optimized for the imaging of slides, cell culture dishes and flasks, and microtiter plates, as well as CC options.

Fluorite											
Magnification	NA	WD (mm)	Brightfield	Phase	Fluorescence	LWD*	CC	Optimal vessel thickness (mm)	Oil	Brand	Cat. No.
4x	0.13	10.58	•		•	•		1		EVOS	AMEP4922
	0.13	10.58	•	•	•	•		1		EVOS	AMEP4980
10x	0.30	7.13	•		•	•		1		EVOS	AMEP4923
	0.25	7.13	•	•	•	•		1		EVOS	AMEP4981
20x	0.50	2.50	•		•		•	1.2		EVOS	AMEP4698
	0.45	6.23	•		•	•		1		EVOS	AMEP4924
	0.45	6.12	•	•	•	•		1		EVOS	AMEP4982
40x	0.65	2.80	•		•	•		1.2		EVOS	AMEP4625
	0.65	1.60	•		•	•		1.2		EVOS	AMEP4683
	0.75	0.72	•		•		•	0.17		EVOS	AMEP4699
	1.30	0.20	•		•		•	0.17	•	Olympus	AMEP4735
	0.65	1.79	•		•	•		1		EVOS	AMEP4925
	0.65	1.79	•	•	•	•		1		EVOS	AMEP4983
60x	0.75	2.20	•		•	•		1.2		EVOS	AMEP4626
	0.75	2.20	•		•	•		1		EVOS	AMEP4926
100x	1.28	0.21	•		•		•	0.17	•	EVOS	AMEP4696

* Recommend 1.0 mm thickness for glass slides.

Semi-apochromat objectives

Semi-apochromat objectives are suitable for all fluorescence applications, with only slightly lower image quality than that afforded by apochromat objectives. They are a more affordable alternative to apochromat, while still delivering excellent image quality compared to most other fluorite objectives.

Semi-apochromat											
Magnification	NA	WD (mm)	Brightfield	Phase	Fluorescence	LWD*	CC	Optimal vessel thickness (mm)	Oil	Brand	Cat. No.
4x	0.13	17	•		•	•		Any		Olympus	AMEP4978
	0.13	17	•	•	•	•		Any		Olympus	AMEP4979
10x	0.30	10	•		•	•		Any		Olympus	AMEP4984
20x	0.45	6.6–7.8	•		•	•		0–1.2		Olympus	AMEP4763
	0.70	0–1.6	•		•	•		0–0.7		Olympus	AMEP4765
	0.50	2.10	•		•		•	0.17		Olympus	AMEP4985
40x	0.60	2.7–4.0	•		•	•		0–1.2		Olympus	AMEP4764
	0.75	0.51	•		•		•	0.17		Olympus	AMEP4986
60x	0.90	0.20	•		•		•	0.11–0.23		Olympus	AMEP4849
	0.70	1.5–2.2	•		•		•	0.11–0.23		Olympus	AMEP4987
100x	0.95	0.20	•		•		•	0.14–0.20		Olympus	AMEP4988

* Recommend 1.0 mm thickness for glass slides.

Apochromat objectives

Apochromat objectives are ideal for the most demanding applications, especially capturing color images in white light. Of all objective types, they provide the highest level of resolution of all EVOS-compatible objectives, fluorescence brightness, contrast, and chromatic correction compared to achromat and fluorite objectives. This table includes LWD objectives that are optimized for the imaging of slides, cell culture dishes and flasks, and microtiter plates, as well as CC options.

Apochromat											
Magnification	NA	WD (mm)	Brightfield	Phase	Fluorescence	LWD*	CC	Optimal vessel thickness (mm)	Oil	Brand	Cat. No.
1.25x	0.04	5.11	•		•	•		Any		Olympus	AMEP4736
2x	0.08	6.22	•		•	•		Any		Olympus	AMEP4751
4x	0.16	13.00	•		•	•		Any		Olympus	AMEP4904
10x	0.40	3.10	•		•		•	0.17		Olympus	AMEP4905
20x	0.80	0.60	•		•		•	0.17		Olympus	AMEP4906
40x	0.95	0.18	•		•		•	0.11–0.23		Olympus	AMEP4907
	1.40	0.13	•		•		•	0.17	•	Olympus	AMEP4908
60x	1.42	0.15	•		•		•	0.17	•	Olympus	AMEP4910
100x	1.45	0.13	•		•		•	0.17	•	Olympus	AMEP4913

* Recommend 1.0 mm thickness for glass slides.

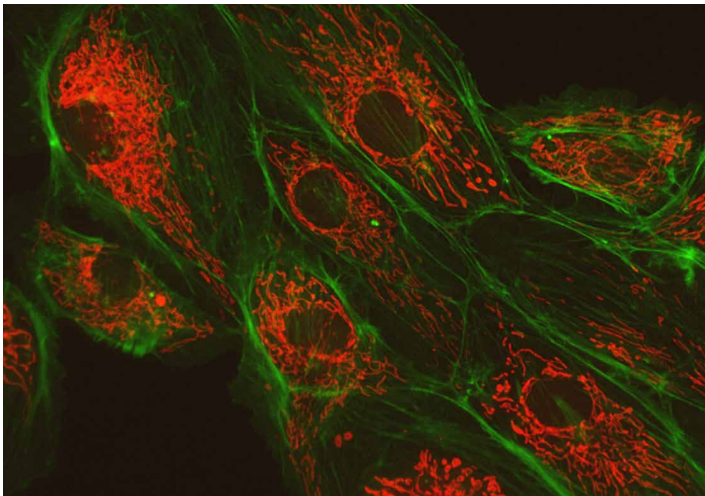


Figure 2. Invitrogen™ FluoCells™ Prepared Slide #1 (Cat. No. F36924) showing bovine pulmonary artery endothelial cells (BPAE) labeled with MitoTracker™ Red CMXRos (Cat. No. M7512) for mitochondria, and then fixed, permeabilized, and stained with Invitrogen™ Alexa Fluor™ 488 Phalloidin (Cat. No. A12379) for F-actin. This two-channel image was acquired on an Invitrogen™ EVOS™ M3000 Imaging System using EVOS™ Light Cubes, GFP 2.0 and RFP 2.0 (Cat. Nos. AMEP4951 and AMEP4952, respectively) and a Thermo Scientific™ Olympus™ 60X Oil Objective, X-Apo, 1.42NA/0.15WD (Cat. No. AMEP4910).