CFI60 Objectives

Type	Use	Model	Immersion	NA	W.D. (mm)	Cover glass thickness	Correction ring	Spring loaded	Brightfield	Darkfield	DIC	Phase contrast	Simple polarizing	Fluorescence		Ti-E PFS
														Visible light	UV	
Achromat	Brightfield (CFI)	4x		0.10	30.00	—			◎				△	○		
		10x		0.25	7.00	—			◎	△			△	○		
		LWD 20x		0.40	3.90	0.17			◎	○●			△	○		
		40x		0.65	0.65	0.17		√	◎	○●			△	○		
		LWD 40xC		0.55	2.7-1.7	0-2.0	√		◎	○●			△	○		
		60x		0.80	0.30	0.17		√	◎	●			△	○		
		100x Oil	Oil	1.25	0.23	0.17		√	◎				△	○		
		100xSH (with iris)	Oil	0.5-1.25	0.23	0.17		√	◎	○●			△	○		
	Polarizing (CFI)	P 4x		0.10	30.00	—			◎				◎	○		
		P 10x		0.25	7.00	—			◎	△			◎	○		
		LWD P 20x		0.40	3.90	0.17			◎	○●			◎	○		
		P 40x		0.65	0.65	0.17		√	◎	○●			◎	○		
		P 100x Oil	Oil	1.25	0.23	0.17		√	◎				◎	○		
	Phase contrast (CFI)	DL 10x		0.25	7.00	—			○	△		◎ PH1	△	△		
		LWD DL 20x		0.40	3.90	0.17			○	○●		◎ PH1	△	△		
		LWD DL 20xF		0.40	3.10	1.2			○			◎ PH1	△	△		
		DL 40x		0.65	0.65	0.17		√	○	○●		◎ PH2	△	△		
		LWD DL 40x		0.55	2.7-1.7	0-2.0	√		○	○●		◎ PH2	△	△		
		DL 100x Oil	Oil	1.25	0.23	0.17		√	○			◎ PH3	△	△		
		BM 10x		0.25	7.00	0.17			○			◎ PH1	△	△		
	Apodized phase contrast (CFI)	ADL 10x		0.25	6.20	1.2			○			◎ PH1	△	△		
		LWD ADL 20xF		0.40	3.10	1.2			○			◎ PH1	△	△		
		LWD ADL 40xF		0.55	2.10	1.2			○			◎ PH1	△	△		
		LWD ADL 40xC		0.55	2.7-1.7	0-2.0	√		○	○●		◎ PH2	△	△		
	Advanced modulation contrast (CFI)	NAMC 10x		0.25	6.20	1.2			○					△		
		LWD NAMC 20xF		0.40	3.10	1.2			○					△		
		LWD NAMC 40xC		0.55	2.7-1.7	0-2.0	√		○					△		
Plan Achromat	Brightfield (CFI Plan)	UW 1x		0.04	3.20	—			◎				△	△		
		UW 2x		0.06	7.50	—			◎				△	△		
		4x		0.10	30.00	—			◎				△	○		
		10x		0.25	10.50	—			◎	△			△	○		
		20x		0.40	1.20	0.17			◎	○●			△	○		
		40x		0.65	0.56	0.17		√	◎	○●			△	○		
		50x Oil	Oil	0.90	NCG0.35	—		√	◎	●			△	○		
		100x Oil	Oil	1.25	0.25	0.17		√	◎				△	○		
		LWD IMSI 100xC		0.85	1.3-0.95	0.6-1.3	√		◎		○*5			○		
	Phase contrast (CFI Plan)	DL 10x		0.25	10.50	—			○	△		◎ PH1	△	△		
		DL 20x		0.40	1.20	0.17			○	○●		◎ PH1	△	△		
		DL 40x		0.65	0.56	0.17		√	○	○●		◎ PH2	△	△		
		DL 100x Oil	Oil	1.25	0.20	0.17		√	○			◎ PH3	△	△		
	No cover glass (CFI Plan)	NCG 40x		0.65	0.48	0		√	◎	○●			△	○		
		NCG 60x (CF objective)*1		0.85	0.35	0		√	◎	●			△	○		
		NCG 100x		0.90	0.26	0		√	◎	●			△	○		
	Super long WD (CFI L Plan EPI)	SLWD 20x		0.35	24.00	0			◎	○●			△	○		
		SLWD 50x		0.45	17.00	0			◎	○●			△	○		
		SLWD 100x		0.70	6.50	0			◎	○●			△	○		
S Plan Fluor*2	Brightfield (CFI S Plan Fluor)	ELWD 20xC		0.45	8.2-6.9	0-2.0	√		◎	○●	○		○	◎	◎	●
		ELWD 40xC		0.60	3.6-2.8	0-2.0	√		◎	○●	○		○	◎	◎	●
		ELWD 60xC		0.70	2.6-1.8	0.1-1.3	√		◎	○●	○		○	◎	◎	
	Apodized phase contrast (CFI S Plan Fluor)	ELWD ADM 20xC		0.45	8.2-6.9	0-2.0	√		○	○●		◎ PH1		○	○	●
		ELWD ADM 40xC		0.60	3.6-2.8	0-2.0	√		○	○●		◎ PH2		○	○	●
		ELWD ADL 60xC		0.70	2.6-1.8	0.1-1.3	√		○	○●		◎ PH2		○	○	
	Advanced modulation contrast (CFI S Plan Fluor)	ELWD NAMC 20xC		0.45	7.40	0-2.0	√		○					○		
		ELWD NAMC 40xC		0.60	3.10	0-2.0	√		○					○		
S Fluor*3	Brightfield (CFI S Fluor)	4x		0.20	15.50	—			◎				△	◎	◎ Wide	●
		10x		0.50	1.20	0.17		√	◎	○●	○		△	◎	◎ Wide	●
		20x		0.75	1.00	0.17		√	◎	○●	○		△	◎	◎ Wide	●
		40x		0.90	0.30	0.11-0.23	√	√	◎	●	○		△	◎	◎ Wide	
		40x Oil	Oil	1.30	0.22	0.17		√ w/stopper	◎		○		△	◎	◎ Wide	●
		100xSH (with iris)	Oil	0.5-1.3	0.20	0.17		√	◎	○●			△	◎	◎ Wide	
Universal Plan Fluor	No cover glass polarizing (CFI LU Plan Fluor EPI)	P 5x		0.15	23.50	—			◎				◎	◎	◎	
		P 10x		0.30	17.50	0			◎	△			◎	◎	◎	
		P 20x		0.45	4.50	0			◎	○●			◎	◎	◎	
		P 50x		0.80	1.00	0		√	◎	●			◎	◎	◎	
		P 100x		0.90	1.00	0		√	◎	●			◎	◎	◎	

*1 To use with the CFI60 optics microscope (not possible in E400), an objective conversion adapter is necessary. *2 Axial chromatic aberration is corrected in shorter wavelength ranges than the Plan Fluor series to improve image clarity.
*3 Transmits an ultraviolet light up to a 340nm wavelength *4 Dedicated for FN1 (CFI75 objective) *5 Compatible with IMSI only

Note 1. Model numbers
The below letters, when attached to the end of model numbers, indicate the respective features.

F: for use with 1.2mm-thick cover glass
C: with correction ring
NCG: for use without cover glass
SH: with iris
WI: water immersion type
W: water dipping type
Mi: multi immersion (oil, water, glycerin) type

Note 2. Cover glass thickness
— : can be used without cover glass
0 : use without cover glass

Note 3. Darkfield microscopy
Possible with the following
△ : universal condenser (dry) and darkfield ring
○ : above and darkfield condenser (dry)
● : darkfield condenser (oil)

Note 4. Phase rings are classified by objective NA
PHL: for Plan Fluor 4x
PH1: NA 0.25 - 0.5
PH2: NA 0.55 - 0.95
PH3: NA 1.0 - 1.40
PH4: NA 1.45 - 1.49
EXT: compatible with external phase contrast of the Ti series

Type	Use	Model	Immersion	NA	W.D. (mm)	Cover glass thickness	Correction ring	Spring loaded	Brightfield	Darkfield	DIC	Phase contrast	Simple polarizing	Fluorescence			Ti-E PFS
														Visible light	UV	NIR	
Plan Fiour	Brightfield (CFI Plan Fluor)	4x		0.13	17.10	—			◎				△	◎	◎		
		10x		0.30	16.00	0.17			◎	△	○		○	◎	◎		●
		20x		0.50	2.10	0.17			◎	○●	○		○	◎	◎		
		20xA MI	Oil, water, glycerin	0.75	0.51-0.35 0.51-0.34 0.49-0.33	0-0.17	√	√	◎	○●	○		○	◎	◎		
		40x		0.75	0.66	0.17		√	◎	○●	○		○	◎	◎		●
		40x Oil	Oil	1.30	0.20	0.17		√ w/stopper	◎		○	EXT PH3-40x	○	◎	◎		●
		60x		0.85	0.40-0.31	0.11-0.23	√	√	◎	●	○		○	◎	◎		
		60xSH (with iris)	Oil	0.50-1.25	0.22	0.17		√	◎	○●	○		○	◎	◎		
		100x Oil	Oil	1.30	0.16	0.17		√ w/stopper	◎		○		○	◎	◎		
		100xSH (with iris)	Oil	0.50-1.30	0.20	0.17		√	◎	○●	○		○	◎	◎		
	Phase contrast (CFI Plan Fluor)	DL 4x		0.13	16.40	1.2			○			◎ PHL		○	○		
		DLL 10x		0.30	16.00	0.17			○	△		◎ PH1		○	○		●
		DL 10x		0.30	15.20	1.2			○	△		◎ PH1		○	○		●
		DLL 20x		0.50	2.10	0.17			○	○●		◎ PH1		○	○		
		DLL 40x		0.75	0.66	0.17		√	○	○●		◎ PH2		○	○		●
		DM 40xDS		0.75	0.66	0.17		√	○	○●		◎ PH2		○	○		
		DLL 100x Oil	Oil	1.30	0.16	0.17		√ w/stopper	○			◎ PH3		○	○		●
		BM 40x		0.75	0.66	0.17		√	○			◎ PH2		○	○		
	Apodized phase contrast (CFI Plan Fluor)	ADH 100x Oil	Oil	1.30	0.16	0.17		√ w/stopper	○			◎ PH3		○	○		●
Plan Apochromat	Brightfield (CFI Plan Apo)	λ 2x		0.10	8.50	—			◎				○	◎	△	◎	
		λ 4x		0.20	20.00	—			◎				○	◎	△	◎	●
		λ 10x		0.45	4.00	0.17			◎	△	○		○	◎	△	◎	●
		λ 20x		0.75	1.00	0.17		√	◎	○●	○		○	◎	△	◎	●
		VC 20x		0.75	1.00	0.17		√	◎	○●	○		○	◎	△		●
		λ 40x		0.95	0.21 (0.25-0.16)	0.11-0.23	√	√	◎	●	○		○	◎	△	◎	●
		λ 60x		0.95	0.15 (0.21-0.11)	0.11-0.23	√	√	◎	●	○		○	◎	△	◎	
		λ 60x Oil	Oil	1.40	0.13	0.17		√	◎		○	EXT PH3-60x	○	◎	△	◎	●
		VC 60xA WI	Water	1.20	0.31-0.28	0.15-0.18	√	√	◎		○	EXT PH3-60x	○	◎	◎		●
		IR 60xWI	Water	1.27	0.17	0.15-0.19	√	√	◎		○	EXT PH3-60x	○	○	△	◎	●
		λ 100x Oil	Oil	1.45	0.13	0.17		√	◎		○	EXT PH3-100x	○	◎	△	◎	●
		VC 100x Oil	Oil	1.40	0.13	0.17		√	◎		○	EXT PH3-100x	○	◎	△		●
		NCG 100x Oil	Oil	1.40	0.16	0		√	◎		○		○	◎	△		
	Phase contrast (CFI Plan Apo)	λ DM 20x		0.75	1.00	0.17		√	○	○●		◎ PH2		○	△	○	●
		λ DM 40x		0.95	0.21 (0.25-0.16)	0.11-0.23	√	√	○	●		◎ PH2		○	△	○	●
		λ DM 60x		0.95	0.15 (0.21-0.11)	0.11-0.23	√	√	○	●		◎ PH2		○	△	○	
		λ DM 60x Oil	Oil	1.40	0.13	0.17		√	○			◎ PH3		○	△	○	●
		λ DM 100x Oil	Oil	1.45	0.13	0.17		√	○			◎ PH3		○	△	○	●
Apochromat	Confocal (CFI Apo)	40xWI λS	Water	1.25	0.18	0.15-0.19		√	◎		○	EXT PH3-40x	○	◎	◎		●
		LWD 40xWI λS	Water	1.15	0.60	0.15-0.19	√	√	◎	●	○	EXT PH3-40x	○	◎	○		●
		60x Oil λS	Oil	1.40	0.14	0.17	√	√	◎		○	EXT PH3-60x	○	◎	◎		●
	Evanescent (CFI Apo)	TIRF 60x Oil	Oil	1.49	0.12	0.13-0.19 (23℃) 0.15-0.21(37℃)	√		◎		○	EXT PH4-60x	○	◎	△		●
		TIRF 100x Oil	Oil	1.49	0.12	0.13-0.19 (23℃) 0.14-0.20(37℃)	√		◎		○	EXT PH4-100x	○	◎	△		●

Type	Use	Model	Immersion	NA	W.D. (mm)	Cover glass thickness	Correction ring	Spring loaded	Brightfield	Darkfield	DIC	Phase contrast	Simple polarizing	Fluorescence		Near-infrared DIC
														Visible light	UV	
Water Dipping	Confocal (CFI Apo)	25xW MP	Water	1.10	2.00	0	√		◎	●	○		○	◎	○	○
	Brightfield (CFI Plan Fluor)	10xW	Water	0.30	3.50	0			◎	△	○		○	◎	◎	○
	Brightfield (CFI Fluor)	20xW	Water	0.50	2.00	0			◎	○●	○		○	◎	◎	○
		40xW	Water	0.80	2.00	0			◎	●	○		○	◎	◎ Wide	○
		60xW	Water	1.00	2.00	0			◎	●	○		○	◎	◎	○
	Brightfield (CFI Apo)	40xW NIR	Water	0.80	3.50	0			◎	●	○		○	◎	△	◎
		60xW NIR	Water	1.00	2.80	0			◎	●	○		○	◎		◎
	Brightfield (CFI Plan)	100xW	Water	1.10	2.50	0	√		◎	●	○		○	◎		○
	Phase contrast (CFI Fluor)	DLL 40xW	Water	0.80	2.00	0			○	●		◎ PH2		○	○	○
	Brightfield (CFI75)	LWD 16xW*4	Water	0.80	3.00	0			◎	●	○		○	◎	○	○

Note 5. Fluorescence microscopy (UV)
△ : possible with visible light that has a longer wavelength than the excitation light used for DAPI
○ : suitable
◎ : recommended for best results
Wide: high transmittance with an ultraviolet wavelength range of up to 340nm

Note 6. Brightfield/DIC/Fluorescence (visible light) microscopy
△ : possible but not recommended
○ : suitable
◎ : recommended for best results

Note 7. Simple polarizing
△ : possible but not recommended
○ : suitable
◎ : retardation measurement is possible with a polarizing microscope

Note 8. Ti-E PFS
● : compatible with PFS

Combinations of DIC Prisms and Objectives

For Ti series inverted microscopes

		System Condenser LWD Dry, Motorized System Condenser LWD Dry						HNA Condenser Lens Dry				HNA Condenser Lens Oil			
		Standard		High Contrast		High Resolution		Standard		High Resolution		Standard		High Resolution	
		Condenser Module	DIC Slider	Condenser Module	DIC Slider	Condenser Module	DIC Slider	Condenser Module	DIC Slider	Condenser Module	DIC Slide	Condenser Module	DIC Slider	Condenser Module	DIC Slider
10x	Plan Fluor 10x S Fluor 10x Plan Apo λ 10x	LWD N1 Dry	10x	—				—				—			
20x	Plan Fluor 20x S Fluor 20x Plan Fluor 20xA MI Plan Apo λ 20x Plan Apo VC 20x	LWD N2 Dry	20x	LWD N1 Dry	20x-C			HNA N2 Dry	20x			HNA N2 Oil	20x		
	S Plan Fluor ELWD 20xC	LWD N1 Dry	20x II	—				—				—			
40x	Plan Fluor 40x S Fluor 40x Plan Apo λ 40x Apo LWD 40xWI λS	LWD N2 Dry	40x I	LWD N1 Dry	40x I-C			HNA N2 Dry	40x I			HNA N2 Oil	40x I		
	Plan Fluor 40x Oil S Fluor 40x Oil Apo 40xWI λS		40x II						40x II				40x II		
	S Plan Fluor ELWD 40xC	LWD N1 Dry	40x IV					—				—			
60x	Plan Apo λ 60x Plan Apo VC 60x Oil Apo TIRF 60x Oil	LWD N2 Dry	60x I				60x I-R		60x I		60x I-R		—		—
	Plan Fluor 60x Oil Plan Fluor 60x Plan Apo λ 60x Oil Apo 60xH λS		60x II			LWD NR Dry	60x II-R	HNA N2 Dry	60x II	HNA NR Dry	60x II-R	HNA N2 Oil	60x II	HNA NR Oil	60x II-R
	Plan Apo VC 60xA WI Plan Apo IR 60xWI		60x IV				60x IV-R		60x IV		60x IV-R		60x IV		60x IV-R
	S Plan Fluor ELWD 60xC	LWD N1 Dry	60x III			—		—		—		—		—	
100x	Plan Fluor 100x Plan Apo λ 100x Oil Plan Apo VC 100x Oil Apo TIRF 100x Oil	LWD N2 Dry	100x I			LWD NR Dry	100x I-R	HNA N2 Dry	100x I	HNA NR Dry	100x I-R	HNA N2 Oil	100x I	HNA NR Oil	100x I-R
	Plan Fluor 100x Oil Plan Fluor 100x Oil Iris		100x II				100x II-R		100x II		100x II-R		100x II		100x II-R

For Ni-E (focusing stage)/Ni-U upright microscopes

		Universal Condenser Dry/Motorized Universal Condenser Dry						DIC Condenser Oil			
		Standard		High Contrast		High Resolution		Standard		High Resolution	
		Condenser Module	DIC Slider	Condenser Module	DIC Slider	Condenser Module	DIC Slider	Condenser Module	DIC Slider	Condenser Module	DIC Slider
10x	Plan Fluor 10x S Fluor 10x Plan Apo λ 10x	N1 Dry	10x	—				—			
20x	Plan Fluor 20x Plan Fluor 20xA MI S Fluor 20x Plan Apo λ 20x Plan Apo VC 20x	N2 Dry	20x	N1 Dry	20x-C			N2 Oil	20x		
	S Plan Fluor ELWD 20xC	N1 Dry	20x II	—				—			
40x	Plan Fluor 40x S Fluor 40x Plan Apo λ 40x Apo LWD 40xWI λS	N2 Dry	40x I	N1 Dry	40x I-C			N2 Oil	40x I		
	Plan Fluor 40x Oil S Fluor 40x Oil Apo 40xWI λS		40x II						40x II		
	S Plan Fluor ELWD 40xC	N1 Dry	40x IV					—			
60x	Plan Apo λ 60x Plan Apo VC 60x Oil Apo TIRF 60x Oil	N2 Dry	60x I				60x I-R		60x I		60x I-R
	Plan Fluor 60x Oil Plan Fluor 60x Plan Apo λ 60x Oil Apo 60xH λS		60x II			NR Dry	60x II-R	N2 Oil	60x II	NR Oil	60x II-R
	S Plan Fluor ELWD 60xC	N1 Dry	60x III			—		—		—	
100x	Plan Fluor 100x Plan Apo λ 100x Oil Plan Apo VC 100x Oil Plan Apo 100x NCG Oil Apo TIRF 100x Oil	N2 Dry	100x I			NR Dry	100x I-R	N2 Oil	100x I	NR Oil	100x I-R
	Plan Fluor 100x Oil Plan Fluor 100x Oil Iris		100x II				100x II-R		100x II		100x II-R

For Ni-E (focusing nosepiece)/FN1 fixed stage microscopes

		FN-C LWD Condenser	
		Condenser Module	DIC Slider
10x	Plan Fluor 10xW	N1 Dry	10x
16x	LWD 16xW (CFI75)	N2 Dry	16xI
20x	Fluor 20xW		20x
25x	Apo 25xW MP		25xI
40x	Apo 40xW NIR Fluor 40xW		40xIII
60x	Apo 60xW NIR Fluor 60xW		60xI
100x	Plan 100xW		100x-III