9. Interference filters for FITC-fluorescence microscopy

The use of the fluorochrome FITC (fluorescein-isothiocyanate) in fluorescence microscopy for investigating immune reactions is widespread within the area of medicine.

In order to achieve optimum observation of fluorescence, it is necessary to have not only a suitable light source but also filters for insertion in the excitation and emission beams that are adapted to the specific absorbing and fluorescing properties of FITC.

For this particular application, the two interference filters – FITCA-40 and FITCE-45 – have been developed. These exhibit high transmission within the passband, have steep curves and block effectively within the blocking range. These filters enable excellent separation of the excitation radiation from fluorescence, which is to be observed.

Type	**FITCA-40**	**FITCE-45**
Spectral values		
Edge wavelength λ_c (τ = 0.5) [nm]	450 ± 5 492 ± 5	515 ± 5/0 560 ± 5
Maximum value τ_D of spectral transmittance within passband	0.75 (460 nm to 480 nm)	0.8 (530 nm to 550 nm)
Maximum value τ_S of spectral transmittance within blocking range	10^{-4} (below 430 nm) 10^{-5} (515 nm to 740 nm) 10^{-4} (740 nm to 850 nm)	10^{-5} (below 500 nm) 10^{-4} (600 nm to 700 nm)
Other properties		
Humidity resistance of filters with preferred dimensions	MIL-Std.810 C, method 507, proc. 1 : 5 cycles	
Operating temperature	up to 70 °C for several hours up to 100 °C for short periods	
Temperature dependence $\Delta\lambda_c/\Delta T$ [nm/°C]	approx. +0.02	

Table 16: Specifications of filter types FITCA-40 and FITCE-45

Preferred dimensions [mm]	
External dimensions	Dimensions of utilizable area
ø 18 +0/–0.3	ø ≥ 16.5
ø 25 +0/–0.3	ø ≥ 23.5
Thickness	≤ 3.5
Other dimensions on request	

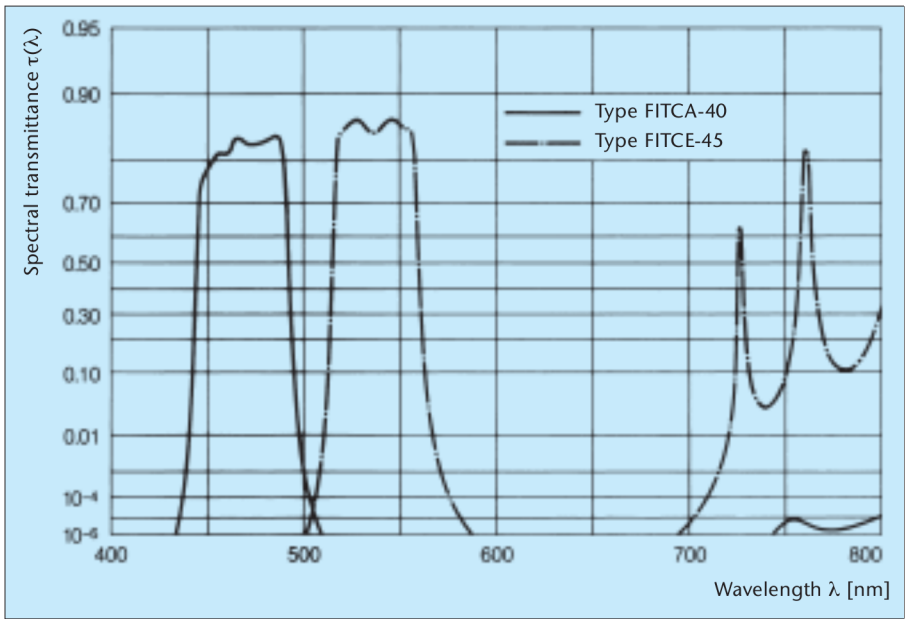

Fig. 28: Spectral transmittance curves (general curves) of filter types FITCA-40 (exciter filter) and FITCE-45 (barrier filter)