

Infrared Long Pass Filters



- Cut-on wavelengths 2 μm to 16 μm
- Transition slope $\leq 7\%$
- High average transmittance
- Excellent blocking
- Standard & custom products
- Custom sizes from 1 mm to 200 mm
- Multiple substrate options

Long pass filters and short pass filters fall into the general category of edge filters. They are defined by a slope or edge defining spectral transmission as a function of wavelength. This slope establishes the transition between high transmission and high rejection or blocking. Newport's infrared long pass filters provide a defined spectral band of high average transmission on the long wavelength side of the cut-on edge. On the short wavelength side of the cut-on edge, the spectral energy is rejected or blocked using a combination of reflection and absorption. Infrared edge filters are typically specified by a cut-on wavelength where the absolute transmission is equal to 5%.

Infrared long pass filters can be manufactured using a variety of substrates that transmit infrared radiation. The most commonly used substrates are Germanium, Silicon, Aluminum Oxide or Sapphire, Zinc Sulphide, Zinc Selenide, fused silica, and glass. The choice of substrate may depend on several factors, but the key factor is typically the spectral range of interest. Newport's infrared long pass filters can be manufactured with cut-on wavelengths ranging from 2.0 μm to 16 μm . For the majority of applications, cut-on slopes of $\leq 7\%$ are adequate but for special applications where a steeper slope is necessary, Newport can modify standard designs to meet these requirements.

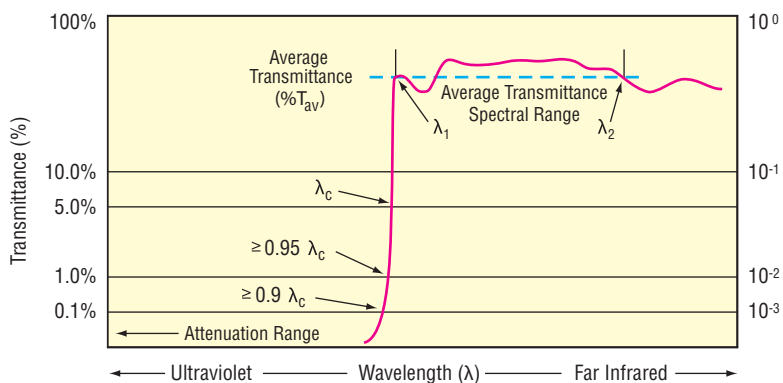
Newport manufactures both OEM and catalog infrared short pass filters. Our catalog infrared short pass filters are offered in a standard 25.4 mm diameter size. Custom and OEM filters can be manufactured in a variety of shapes and sizes ranging from 1 mm to 200 mm.

Custom & OEM Capability Specifications

Spectral Range	2.0 μm - 16.0 μm
Cut-on/Cut-off Slope	3% - 7%
Transmittance	70% - 85% average
Blocking	$\leq 0.1\%$ typical; $\leq 0.01\%$ achievable
Surface Quality	F/F (80/50) per MIL-F-48616
Coating Adhesion	MIL-F-48616
Coating Hardness	MIL-F-48616
Humidity Resistance	MIL-F-48616
Operating Temperature Range	77 K ($\approx -196^\circ\text{C}$) to ≈ 423 K ($+150^\circ\text{C}$) (typical)
Substrate Options	Ge, Si, Al_2O_3 , ZnS, ZnSe, Glass, Fused Silica
Size Range	1 mm - 200 mm

Catalog Product Specifications

Size	25.4 mm diameter
Size Tolerance	+0.0 mm, -0.5 mm
Minimum Active Area	22.4 mm diameter
Thickness	0.5 mm – 2.0 mm
Specification Temperature	23 °C
Cut-on/Cut-off Slope	≤7%
Blocking	≤0.1% T from $0.9\lambda_c$ through ultraviolet (design goal)
Surface Quality	F/F (80/50) per MIL-F-48616
Humidity Resistance	MIL-F-48616
Cleaning	Non-abrasive method, acetone or isopropyl alcohol on lens tissue recommended
Operating Temperature Range	-50°C to +150°C (typical)



Catalog Product Ordering Information

Cut-on/Cut-off Wavelength λ_c	Cut-on/Cut-off Wavelength Tolerance	Transmittance Band	Transmittance	Model
				25.4 mm diameter
1.5 μm	$\pm 0.03 \mu\text{m}$	1.7 μm - 3.4 μm	$\geq 75\%$ average	RL-1500-F
2.0 μm	$\pm 0.04 \mu\text{m}$	2.2 μm - 4.1 μm	$\geq 80\%$ average	RL-2000-F
2.5 μm	$\pm 0.05 \mu\text{m}$	2.8 μm - 5.0 μm	$\geq 80\%$ average	RL-2500-F
3.0 μm	$\pm 0.06 \mu\text{m}$	3.3 μm - 6.0 μm	$\geq 80\%$ average	RL-3000-F
3.5 μm	$\pm 0.07 \mu\text{m}$	3.8 μm - 7.0 μm	$\geq 75\%$ average	RL-3500-F
4.0 μm	$\pm 0.08 \mu\text{m}$	4.4 μm - 8.0 μm	$\geq 75\%$ average	RL-4000-F
4.5 μm	$\pm 0.09 \mu\text{m}$	5.0 μm - 9.0 μm	$\geq 75\%$ average	RL-4500-F
7.5 μm	$\pm 0.15 \mu\text{m}$	8.3 μm - 14.0 μm	$\geq 75\%$ average	RL-7500-F

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