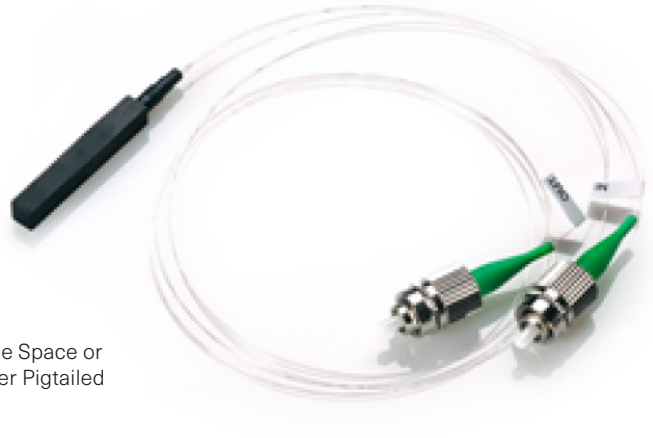
NoiseBlock™ ASE SUPPRESSION FILTERS

For Ultra-Low Frequency Raman Spectroscopy with High Signal-to-Noise

NoiseBlock™ ASE (Amplified Spontaneous Emission) filters suppress the broad spectrum of spontaneous emission that commonly occurs in laser diodes to provide an ASE free, narrowband lasing emission.

Adding a NoiseBlock™ ASE filter to a single frequency wavelength stabilized laser effectively reduces broadband spectral ASE background to more than 70dB below the laser line while transmitting 90% of the single frequency line (see graph on next page).

The filter's narrow spectral profile (HWHM <10 cm^{-1}) is designed to match the SureBlock™ ultra-narrow-band notch filter, making it ideal for enabling ultra-low frequency Raman spectroscopy with high signal-to-noise.



Free Space or
Fiber Pigtailed

FEATURES

- High transmittance at design wavelength
- Reduce typical broadband ASE levels to more than 70 dB below the laser line
- Narrow spectral bandwidth
- Customizable slant angle for angular separation of beams
- Large angular acceptance allows use for both, spatially single and multimode laser
- No degradation under high power illumination conditions
- Environmentally stable at high temperature and humidity with over 12,000 hours of testing at 150°C

APPLICATIONS

- Removal of broadband ASE, fluorescence, and parasitic laser line emission
- ASE noise reduction for Raman spectroscopy
- ASE removal after optical amplifier stages
- Dense wavelength multiplexing/de-multiplexing
- Spectral combining
- Telecommunication

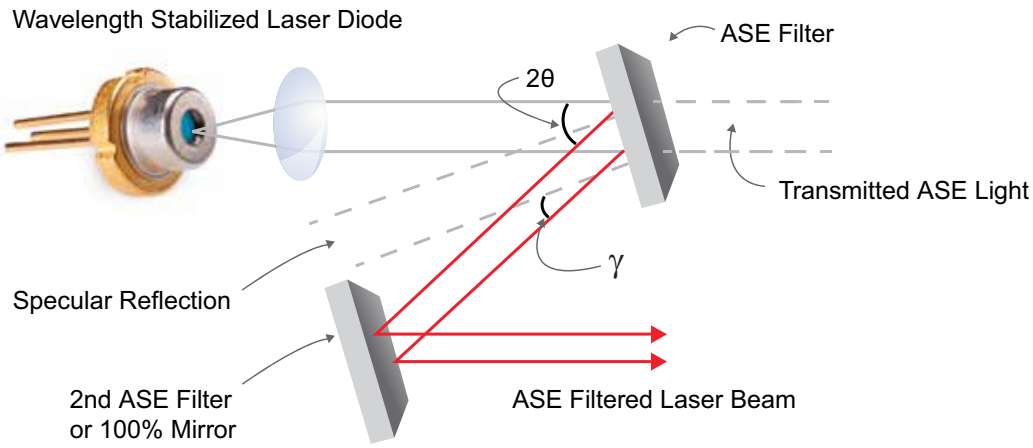
COHERENT

Specification	Typical
Center Wavelength (nm)	405, 532, 640, 658, 685, 690, 780.25, 785, 808, 830, 976, 1064, 1550
Bandwidth[1] (HWHM) cm^{-1} GHz	 <10 <300
Diffraction Efficiency (%)	>90 (>70 for 405 nm)
Temperature Dependence (nm/°C)	0.01
Total Deflection Angle (2θ) (degrees)	8 to 12
Slant Angle (γ) (degrees)	2
Clear Aperture Diameter	4.5 mm in ½" mount. Custom sizes available.

Notes:
1. Grating bandwidth is a function of wavlength and thickness.

Principle of Operation

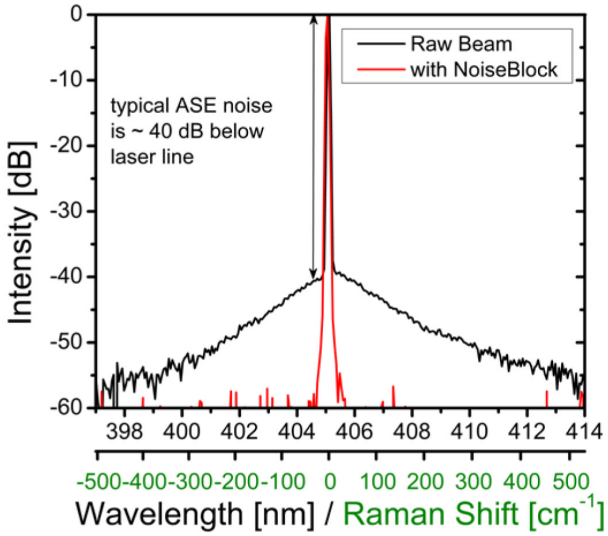
NoiseBlock™ ASE filters are designed to transmit ASE emission from a wavelength stabilized laser and reflect only the desired single frequency line. The inter-beam angle is chosen to separate the diffracted beam and the residual surface reflections, resulting in a clean, ASE-free output.



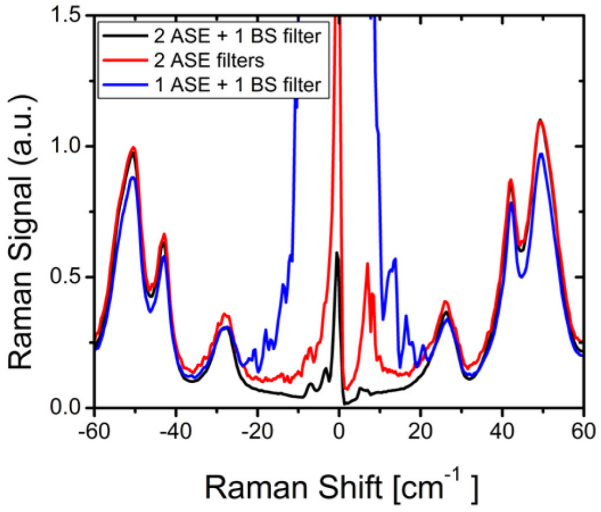
Principle of Operation

Adding a single NoiseBlock™ ASE filter (see left image below) eliminates almost all ASE light from the emission of an Coherent SureLock™ 785 nm single frequency laser diode and enables diode lasers to be used as substitutes for gas lasers in many applications.

Reduction of ASE light
with NoiseBlock™ Filter



Raman signal from Sulfur
with multiple filters



For applications such as low frequency Raman spectroscopy that require extreme attenuation, filtering of the residual ASE near the laser line must be >70 dB below the excitation laser line for high signal-to-noise. In these cases, combining two ASE filters with a spectrally matched 90/10 beamsplitter (BS) filter, enables optimum alignment of SureBlock™ ultra narrow-band notch filters for maximum Rayleigh light suppression with high throughput to within 10 cm^{-1}.

The above image on the right shows the effect of adding one or two ASE filters on the measured sulphur spectrum from a low frequency Raman system at 785 nm. A single ASE filter and beamsplitter still shows residual ASE out to 20 cm^{-1}.

Ordering Information

ASE-λλλ.λ-AA

λ: Wavelength[1] (nm)
A: Package Style[2]

Notes:
1. Specified in vacuum to 0.1 nm accuracy required for non-gas lines.
2. FS = Standard ½" round mount, FP = Fiber pigtailed (available for standard telecom wavelengths).

For more information
www.coherent.com