OMEGA OPTICAL

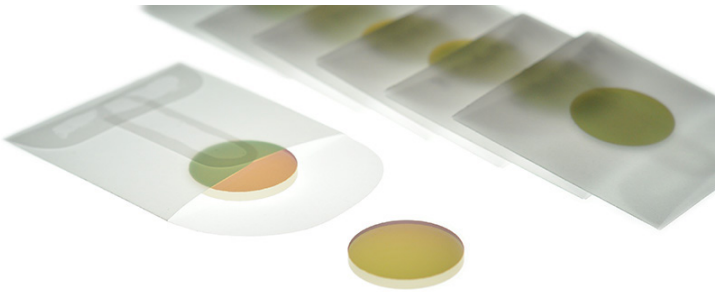
Custom Filters from Prototype to Production

TECHNICAL PRODUCT SHEET

Raman Filters

Overview

Omega offers several options for laser-line filtering and laser-wavelength blocking for Raman spectroscopy applications. Our hard coatings are prepared using plasma-assisted reactive magnetron sputtering for exceptional durability, low scatter, high blocking and high transmission at the desired wavelength.



Why choose an Omega Filter?

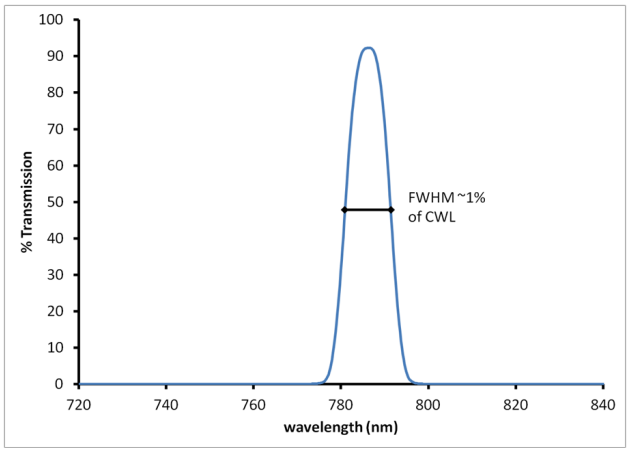
- Use Omega to design and manufacture custom filters that will differentiate your product
- 50 years of engineering services to optimize your filter needs
- Extensive inventory for rapid prototyping and development
- High-volume production
- In house optic shop for custom sizes, shapes and substrates
- USA made, ITAR and ISO registered

Laser-line Filters

Laser-line filters can be used to remove the ASE floor, unwanted laser lines or confounding signals, like those generated by Raman scattering of laser light within an optical fiber. Main specifications are center wavelength (CWL), full-width at half-max (FWHM) and edge steepness.

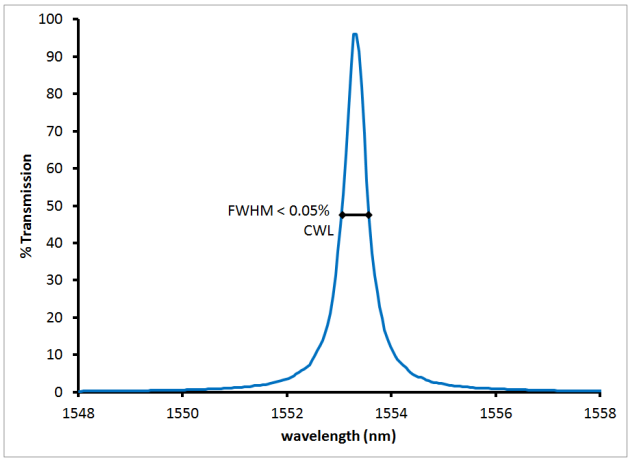
Standard Laser-line Filter

A 785 nm laser-line filter. Shown with 92% transmission, with an anti-reflection coating on the back side, this will increase to 96%.



Ultra Narrow Band Filter

An ultra-narrow band centered at 1553.33 nm within the ITU C-band. This filter can be tilt-tuned to follow the laser emission wavelength.



Is your Laser wavelength drifting? All laser-line filters can be tilt-tuned a few nm by changing the angle-of-incidence (AOI). AOI changes within 10 degrees do not appreciably affect filter performance (%T, steepness and FWHM). The center wavelength moves to lower values at angle.

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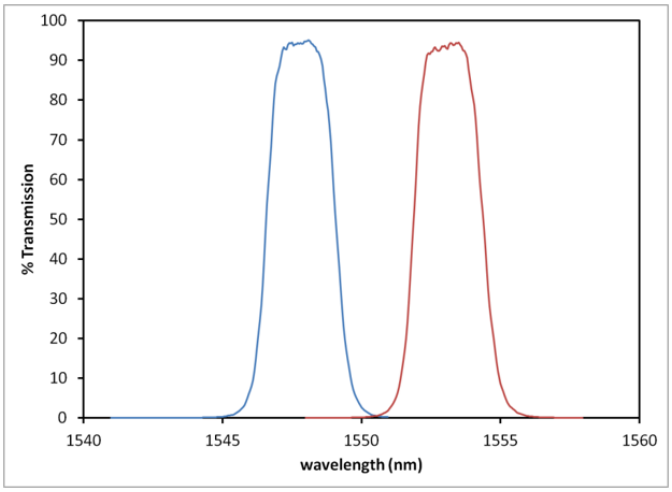
Raman Filters

Flat-topped Laser Line Filters

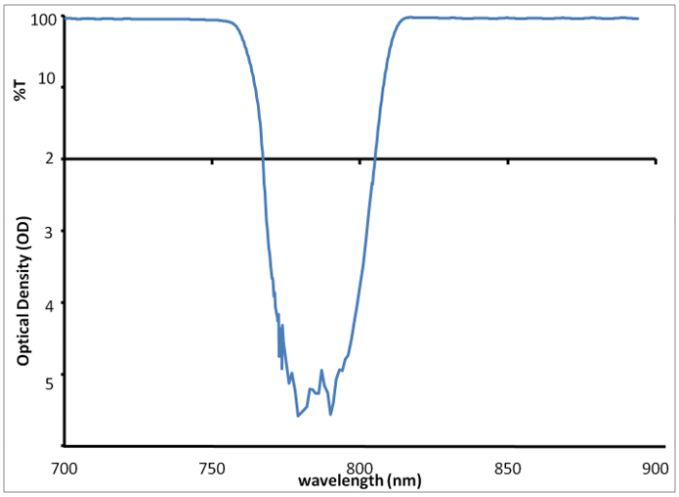
- Steep edges and flat top allows for laser wavelength instability and/or multiple angles-of-incidence
- Edge steepness (10%- 90% T) of 1 nm or less
- FWHM of 0.2% of CWL



Laser-line Blocking Filters

Standard Notch Filters

Notch filters (or rejection band filters) block the laser wavelength from reaching the detector. Narrow notches allow for simultaneous detection of Stokes and anti-Stokes Raman signals.



785 nm notch filter plotted in a log scale

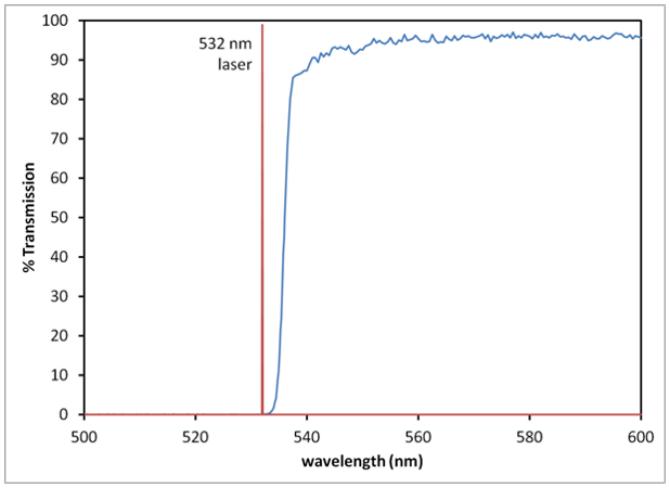
The previous figure shows a 785 nm notch filter plotted in a log scale. Note that we are reaching the lower detection limit of our spectrometer at OD 5, blocking may be higher at the laser wavelength. The width of this notch is ~10% of the laser wavelength (at 50% T). Omega is constantly striving to achieve narrower notches.

Narrow bandpass filters can also be used in a reflective filter assembly to achieve a much narrower notch. **Read our Technical Note- Thinking Inside the Box to learn more!**

Longpass Raman Edge Filters

The physics of thin-film optics limits the width of a notch filter. For Stokes shift measurement, a longpass edge filter can enable the detection of lower frequency Raman signals (<500 cm^{-1})

- > 90% transmission above the cutoff wavelength
- Transition from OD 0.3- OD 6 in 300 cm-1 or less



A 532 Raman Edge FIlter

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