

# Pulse Stretcher/Compressor Filters



## Features:

- Use as a stretcher or compressor by flipping the input facet 180°
- Integrated mounting platform
- Compact and easy to align
- Low scatter and loss
- Environmentally stable at high temperature and humidity
- No degradation over time even under high power illumination conditions
- Free space diffraction efficiency >90%
- Low spatial chirp
- No stitching errors
- Highly repeatable performance
- Near diffraction limited beam quality

## Applications:

- Temporal Stretching/Compression of Ultrafast Optical Pulses

Ondax's PicoPulse™ pulse stretcher/compressor filters are compact replacements for ruled gratings and fiber Bragg gratings (FBGs) in ultrafast laser systems that use chirped pulse amplification (CPA). PicoPulse™ filters are robust, solid-glass volume holographic gratings (VHGs) that enable both miniaturization and simplification of the CPA system when compared to equivalent dispersive diffraction grating pairs. Free space operation within the filter allows larger input beams to be used with many orders of magnitude higher power than FBGs or other gel-based volume grating technologies.

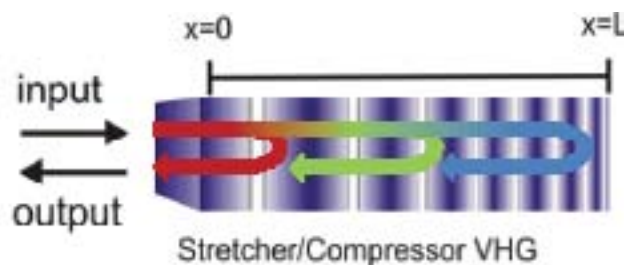
The distortion-free round output beam profile after stretching and compression maintains near-diffraction-limited performance of the input beam. An integrated mounting platform simplifies alignment, while drastically reducing the overall footprint and opto-mechanical sensitivity. Each filter is recorded in a proprietary glass with high efficiency and low loss to ensure stable performance over a wide range of temperatures and operating conditions.

## Specifications:

Parameter	PicoPulse™ Filter Performance
Center Wavelength Range	Standard: 1029-1064, 400nm to 2000+nm available
Dispersion Rate	Standard: 50ps/nm, 10-100ps/nm available
Spectral Bandwidth	Typical: 1-10nm, others available
Stretched Pulse Length	Typical: 200-300ps
Diffraction Efficiency	>90% in free space
Fiber Coupling Efficiency	Typical: >70% into 6/125 μm single mode fiber
Grating Length	1mm to 30mm
Aperture Size	Standard: 2mm x 5-15mm
Standard Mount Dimensions	17.5 mm x 32 mm x 12 mm

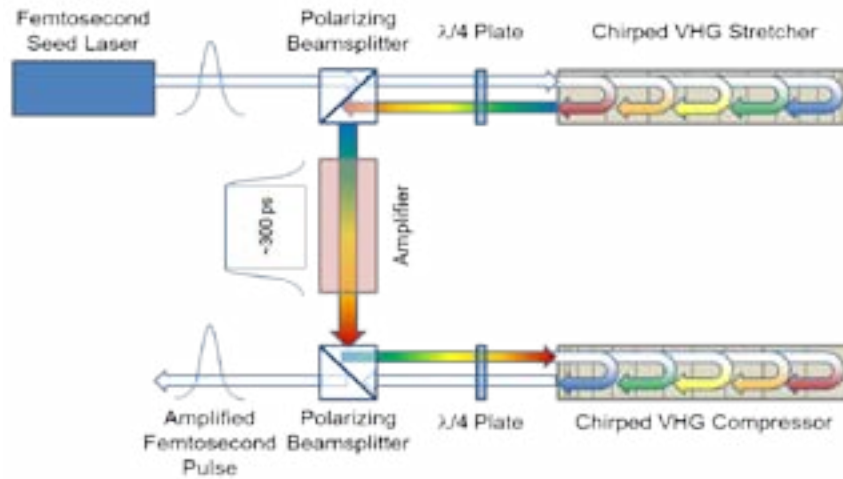
## Principle of Operation

As with FBGs, short and long spectral components of the pulse are diffracted at different points within the CVHG due to the smooth grating chirp, creating a linearly varying group delay.

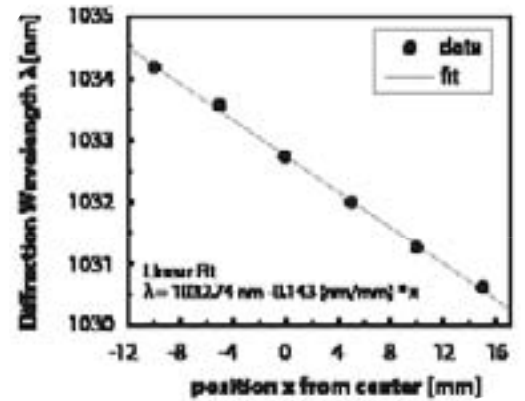


## Pulse Stretcher/Compressor Filters

### Chirped Pulse Amplification System with 2 PicoPulse™ Filters

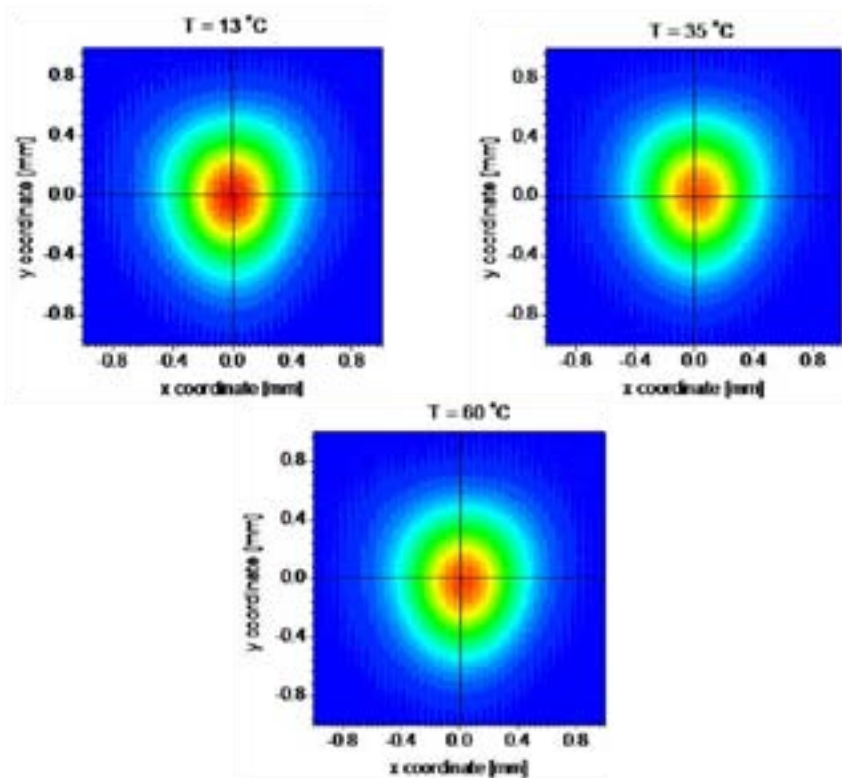


### Smoothly Varying Linear Chirp

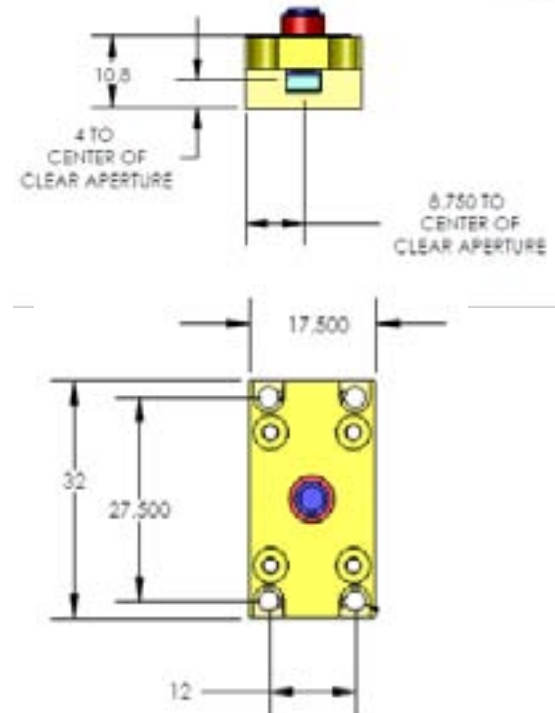


### Stable Output Profile Across a Wide Range of Temperatures

The output beam reflected from PicoPulse™ gratings after both stretching and re-compression maintains the high quality of the input mode. Spatial profile and free-space efficiency remains stable even over a wide range of temperatures. The images below show the output beam profile measured after 1.5m of free space propagation at 13°C, 35°C and 60°C.



### Standard Dimensions



Ondax PicoPulse™ pulse stretcher/compressor filters are produced in a proprietary glass designed for long lifetime, high efficiency and low loss. Ondax's fabrication process is highly stabilized to ensure excellent part-to-part repeatability.

