

# LLTF CONTRAST™

## THE ULTIMATE SUPERCONTINUUM FILTER UP TO 20W INPUT POWER



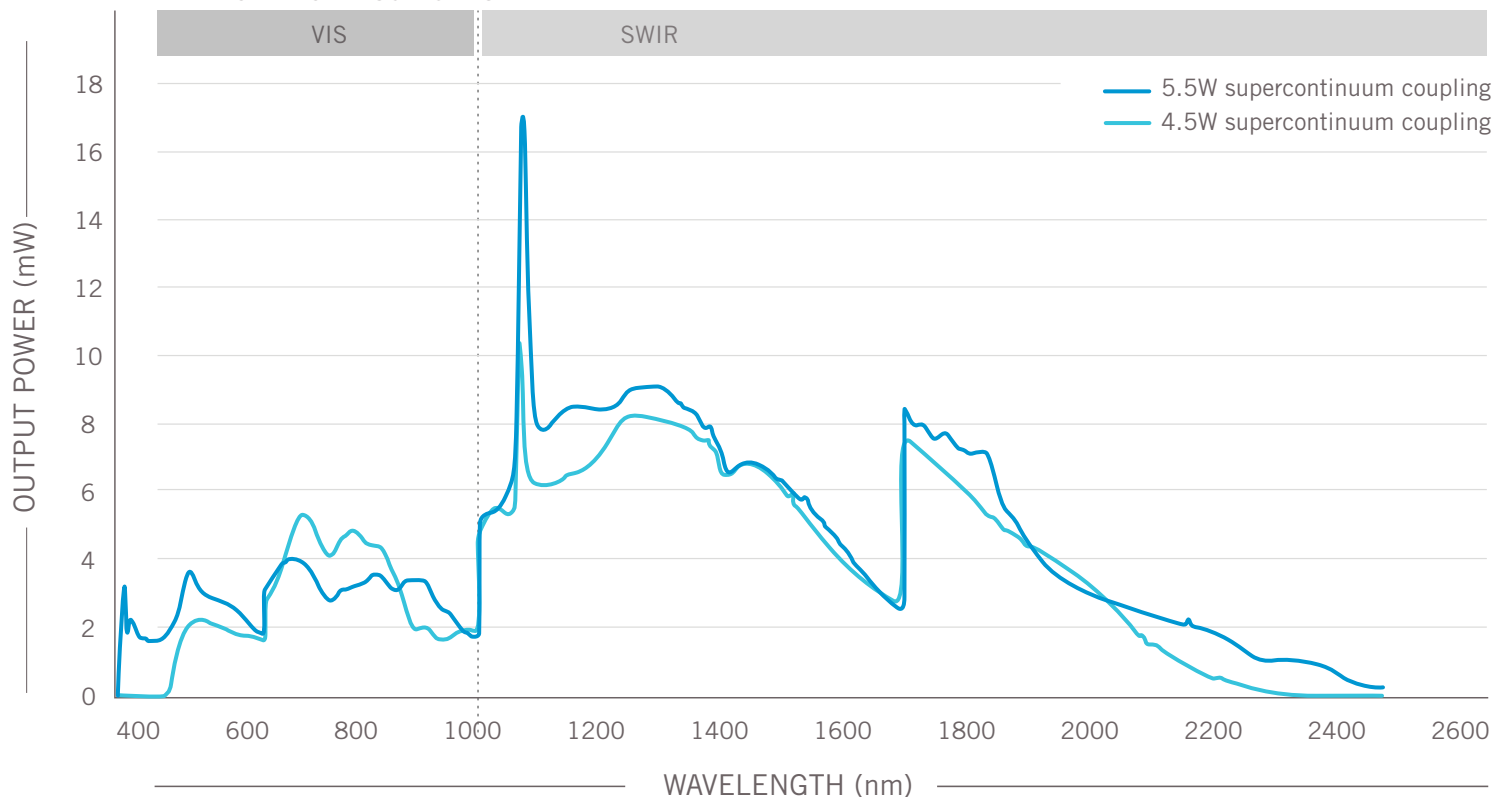
The Laser Line Tunable Filter (LLTF) is a non-dispersive tunable bandpass filter based on volume holographic gratings. It delivers the highest signal throughput in the industry, and is also unique in that it combines very high optical density (> OD6) and outstanding out-of-band rejection with wide tunability. A single filter can be tuned from 400 nm to 1000 nm (VIS) or 1000 nm to 2500 nm (SWIR), with bandwidths (FWHM) of <2.5 nm and <5 nm respectively. The output pointing is very stable, removing the need to realign optical setup. The LLTF Contrast is compatible with any VIS-NIR supercontinuum or laser source. Depending on the application, a series of options are available.

TECHNICAL SPECIFICATIONS			
	CONTRAST VIS	CONTRAST SWIR	CONTRAST X
Spectral Range <i>(extended and reduced spectral ranges also available**)</i>	400 - 1000 nm	1000 - 2300 nm (2500 nm optional*)	where X represents a custom spectral range
Bandwidth (FWHM)***	1.0 - 2.5 nm	2.0 - 5.0 nm	<b>High resolution</b> 0.15 nm - 0.9 nm
Out of Band Rejection <i>(fibered output or with the background suppressor accessory)</i>	< -60 dB @ ± 40 nm	< -60 dB @ ± 80 nm <small>(measured up to 1.7 μm)</small>	Depends on the bandwidth
Maximum input average power	HP8 (up to 8W), HP20 (up to 20W)	HP8 (up to 8W), HP20 (up to 20W)	HP4 (up to 4W)
Peak Efficiency	typical around 60%		
Optical Density (OD)	> OD6 (measured at 1064 nm)		TBD
Grating Damage Threshold	< 5 GW/cm <sup>2</sup> peak power @ 1064 nm, 8 ns		
Input Beam Diameter	≤5 mm		
Input Beam Divergence Requirement	< 1 mrad		
Wavelength Relative Accuracy	FWHM / 8		
Pointing Stability	< 1 mm lateral displacement @ 1 m from filter		
Scanning speed (multiple step)	35 ms stabilization time for 0.1 nm step, 45 ms stabilization time for 0.2 nm step, 55 ms stabilization time for 1 nm step, 60 ms stabilization time for 2 nm step, 65 ms stabilization time for 5 nm step, 70 ms stabilization time for 10 nm step		
<i>For displacement within the same grating</i>			
Operating System (OS)	Windows 10 (64 bits), Windows 8 (64 bits) and Windows 7 (64 bits)		
Software	PHYSpec™ included (SDK available)		
Computer Connection	USB 2.0 (compatible 1.1)		
Dimensions (L x W x H)	9" x 6.3" x 6.7" 23 cm x 16 cm x 17 cm		
Operating Temperature	10 to 40°C		
Storage Temperature	0 to 50°C		
Power Supply	100 - 240 V , 50 - 60 Hz		
OPTIONS & ACCESSORIES			
Enhance SWIR	N/A	* up to 2500 nm	
Fibered Output	An X-Y-Z translation adjustment allows coupling optimization.		
Harmonic Filter	Blocks the harmonics coming from the region 400 - 500 nm	Blocks the harmonics coming from the region 500 - 850 nm and/or 850 - 1250 nm	Filter chosen according to spectral range
Alignment Kit (for free space)	In free-space (input/output) configuration, the alignment kit allows the user to rapidly find the correct alignment		
** Extended and reduced spectral ranges also available	e.g.: 500-2000 nm, 400-1700nm, 500-900 nm, 400-650 nm, 650-1000 nm, 1000-1700 nm, 1700-2300 nm, etc.		

\*\*\* Valid if the divergence of the input beam does not exceed 1 mrad

NOTE: Photon etc reserves the right to change the design and specification of the product at any time, without notice.

## LLTF VIS AND SWIR OUTPUT POWER



## LLTF EXTENDED (500-2000 nm) OUTPUT POWER

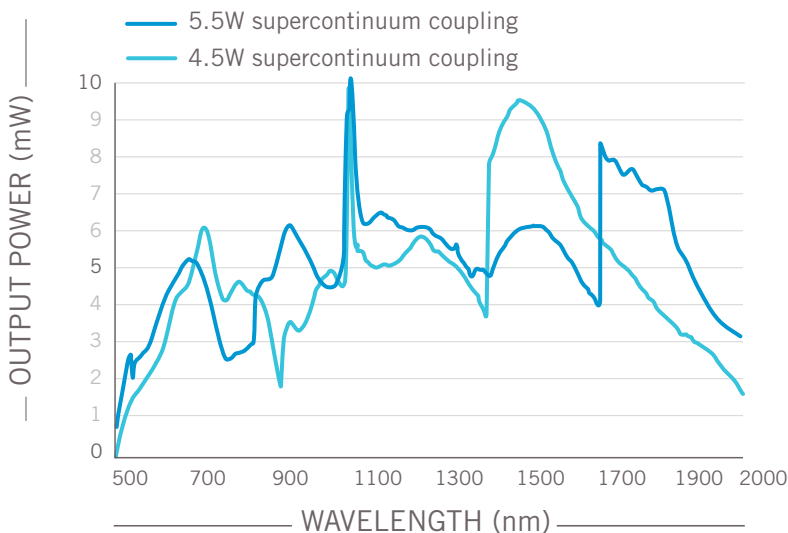
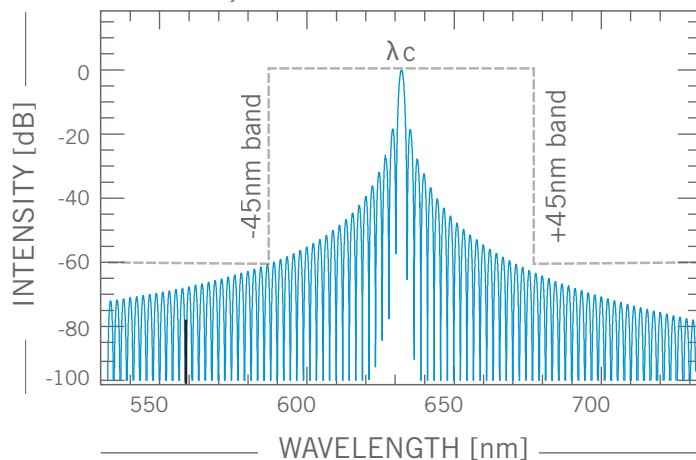


Illustration of the out-of-band rejection of a volume holographic grating at  $\lambda_c = 632$  nm. Bands of  $\pm 45$  nm are presented and an out-of-band rejection of -60 dB is obtained.



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