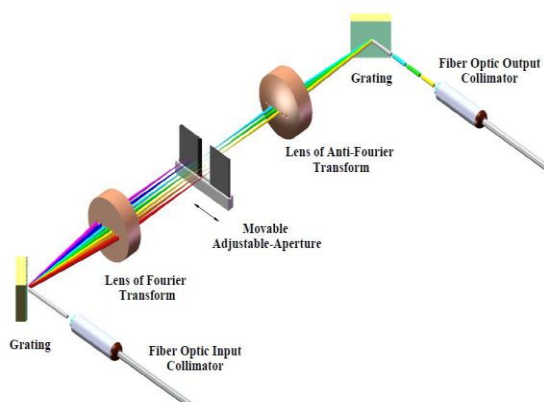




## Bandwidth-Adjustable Tunable Filter (Flat-Top)

Bandwidth-Adjustable Filters of WLTF-BA-series are built based on a platform of free-space optical Fourier transformation combining with diffraction grating. It is a 2-port fiber-optic device. When a wide-band spectrum is injected to the input port, the tunable filter will select a target band for output and reject the rest band of spectrum. Both bandwidth and center wavelength of the selected target band are tunable independently. Wavelength-tuning is actuated by either a precise micrometer driver or a built-in micro step-motor connected to a PC through a USB interface in which actuation is monitored by a built-in encoder and controlled dynamically in a closed-loop.

Unique optics design provides offers flat-top transmission and unprecedented low insertion loss & polarization dependent loss (PDL). Precise tuning mechanism enables filters to provide high wavelength resolution and excellent wavelength repeatability. Both manual and electric version filters are available over X-, O-, S-, C-, & L- bands.



### Operating Principle and Tuning Mechanism

### Key Features

- Both center wavelength and bandwidth tunable independently
- Unprecedented low insertion loss and polarization-dependent loss (PDL)
- Sharp filter edge rolling-off slope
- Flat-top profile of transmission band
- Up to 120nm wavelength tuning range
- High out-band suppression
- High optical power handling up 5.0 W (CW)

### Applications

- ASE noise suppression
- Wideband WDM channel filtering
- Wideband continuous light source
- Pulse Shaping
- Signal filtering



Manual Version of WLTF-BA-S- or P-

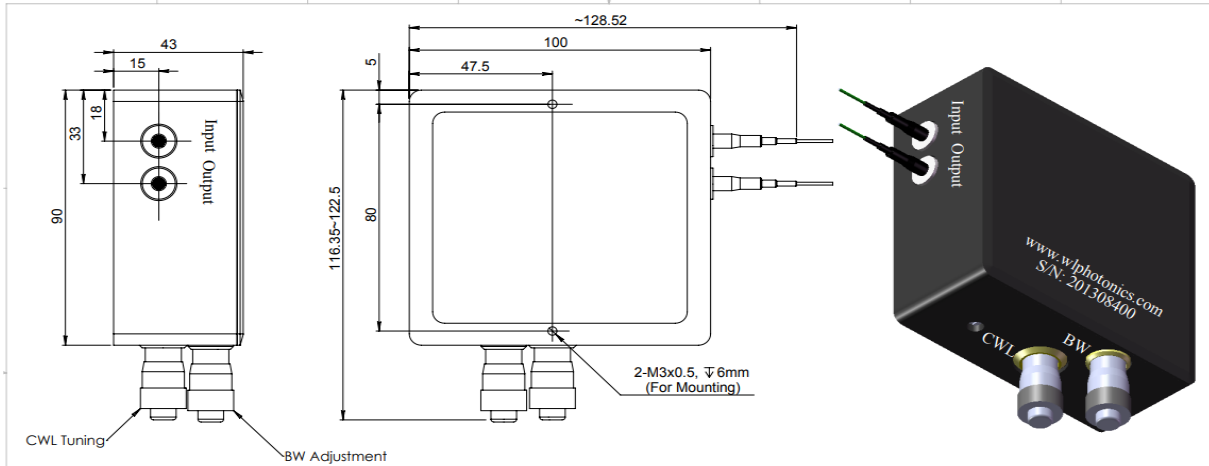


## Specifications of Manual Tunable Filter (WLTF-BA-S, -P, or -U)

Center Wavelength	1060nm±15nm	1310nm±15nm	1550nm±20nm	1600nm±20nm
Tuning Range (TR)	80nm-BW	90nm-BW	100nm-BW	100nm-BW
Insertion Loss	1.5dB typ. and 3.5dB max. (connector exclusive)			
FWHM Bandwidth (BW) <sup>2</sup>	BW <sup>1</sup> <sub>min</sub> to 40nm	BW <sub>min</sub> to 40nm	BW <sub>min</sub> to 40nm	BW <sub>min</sub> to 40nm
	BW <sub>min</sub> =1.40nm for S-version	BW <sub>min</sub> =2.00nm for S-version	BW <sub>min</sub> =2.50nm for S-version	BW <sub>min</sub> =2.50nm for S-version
	BW <sub>min</sub> =0.60nm for P-version	BW <sub>min</sub> =0.80nm for P-version	BW <sub>min</sub> =1.00nm for P-version	BW <sub>min</sub> =1.20nm for P-version
	BW <sub>min</sub> =0.20nm for U-version	BW <sub>min</sub> =0.25nm for U-version	BW <sub>min</sub> =0.35nm for U-version	BW <sub>min</sub> =0.40nm for U-version
Wavelength Resolution	0.02nm			
Wavelength Repeatability	±0.02nm			
Polarization-Dependent Loss	0.15dB typ./0.30dB max. over tuning range (SM fiber pigtail only)			
Extinction Ratio	20dB (PM fiber pigtail only without connector)			
Spectral Shape	Flat-top			
Passband Flatness	<0.15dB (Measured with BW <sub>min</sub> )			
Filter Edge Rolling-Off Slope <sup>3</sup>	30dB/nm for S-version	25dB/nm for S-version	22dB/nm for S-version	20dB/nm for S-version
	80dB/nm For P-version	60dB/nm For P-version	55dB/nm For P-version	50dB/nm For P-version
	150dB/nm For U-version	120dB/nm For U-version	100dB/nm For U-version	100dB/nm For U-version
Max. Optical Power	500mW (CW) standard and up to 5.0W (CW) high power available on request			
Return Loss	>45dB			
Out-Band Suppression	>50dB for BW < 2xBW <sub>min</sub>			
Polarization Mode Dispersion	<0.2ps (SM fiber pigtail only)			
Group Delay	<0.1ps/nm			
Pigtail Fiber Type	HI1060	SMF-28 or SMF-28e		
	Panda PM980	Panda PM1300	Panda PM1550	
	PM fibers aligned in PM slow axes (fast-axis blocking) unless specified as others, LMA or PLMA fiber pigtails are available on request.			
Operating Temp.	10°C to 50°C			
Storage Temp.	-10°C to 75°C			
Dimension	See dimensions drawings below			
Weight	<0.75kg			
Other	RoHS compliant			
Note: <sup>1</sup> Minimum achievable flat-top FWHM bandwidth. <sup>2</sup> More than 40nm up to 100nm is available on request. <sup>3</sup> Measured from -3dB down to -43dB level.				



## Dimensions of Manual Tunable Filter (WLTF-BA-S or P-version)



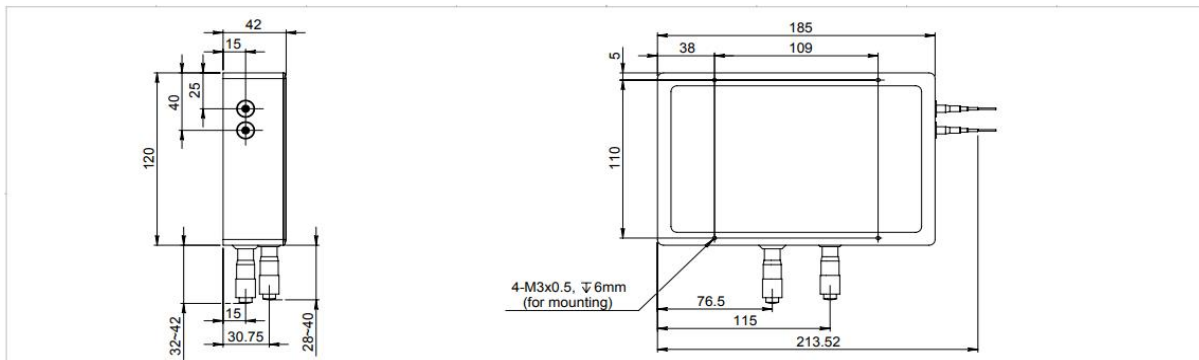
### Notes/Specifications:

1. Manual Tunable Bandwidth/Center Wavelength Optical Filter of WLTF-BA-S-, or P-Version over 980-1650nm.
2. Down to 1.0nm FWHM (flat-top) Bandwidth.
3. Up to 100nm Tuning Range.
4. 2.5dB typ. and 3.0dB max. Insertion Loss over 100nm Range.
5. >45dB Return Loss.
6. 0.15dB typ. and 0.30dB max. PDL (SM fiber pigtail only).
7. >20dB ER (PM fiber pigtail only).
8. 500mW (CW) max. Optical Input Power. Up to 5W (CW) Optical Power Handling Available on Request.

WL Photonics Inc. reserves the right to change dimensions without notice.

WL Photonics Inc.		TITLE: Dimensions of WLTF-BA-S-, P-Version Filter	
Size Projection:	Date: Dec. 25/2023	SIZE DWG. NO. A DS-007	REV 2
SCALE: 1:1		WEIGHT:	SHEET 1 OF 1

## Dimensions of Manual Tunable Filter (WLTF-BA-U-version)



### Notes/Specifications:

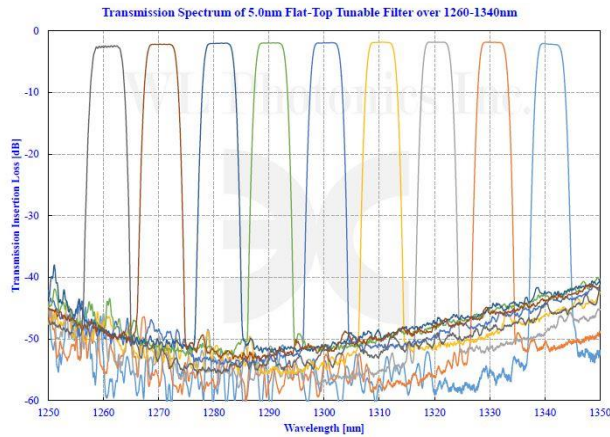
1. Manual Tunable Bandwidth/Center Wavelength Optical Filter of WLTF-BA-U-Version over 980-1650nm.
2. Down to 0.2nm FWHM (flat-top) Bandwidth.
3. Up to 100nm Tuning Range.
4. 2.5dB typ. and 3.5dB max. Insertion Loss over 60nm Range.
5. >45dB Return Loss.
6. 0.15dB typ. and 0.30dB max. PDL (SM fiber pigtail only).
7. >20dB ER (PM fiber pigtail only).
8. 500mW (CW) max. Optical Input Power. Up to 5W (CW) Optical Power Handling Available on Request.

WL Photonics Inc. reserves the right to change dimensions without notice.

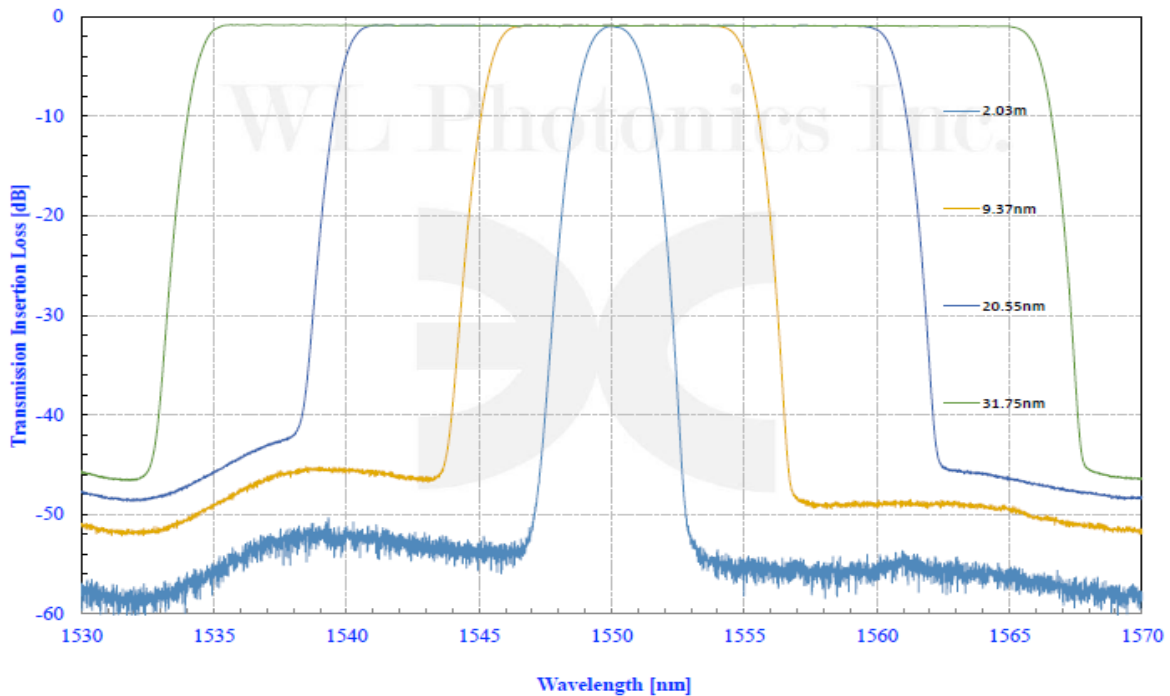
WL Photonics Inc.		TITLE: Dimensions of WLTF-BA-U-Version Filter	
Size Projection:	Date: Nov. 17/2022	SIZE DWG. NO. A BA-002	REV 1
SCALE: 1:2		WEIGHT:	SHEET 1 OF 1



## Example: Typical Transmission Spectrum and Tuning Dispersion of 5.0nm Filter over O-Band Tuning Center Wavelength of Transmission Band over O-Band.

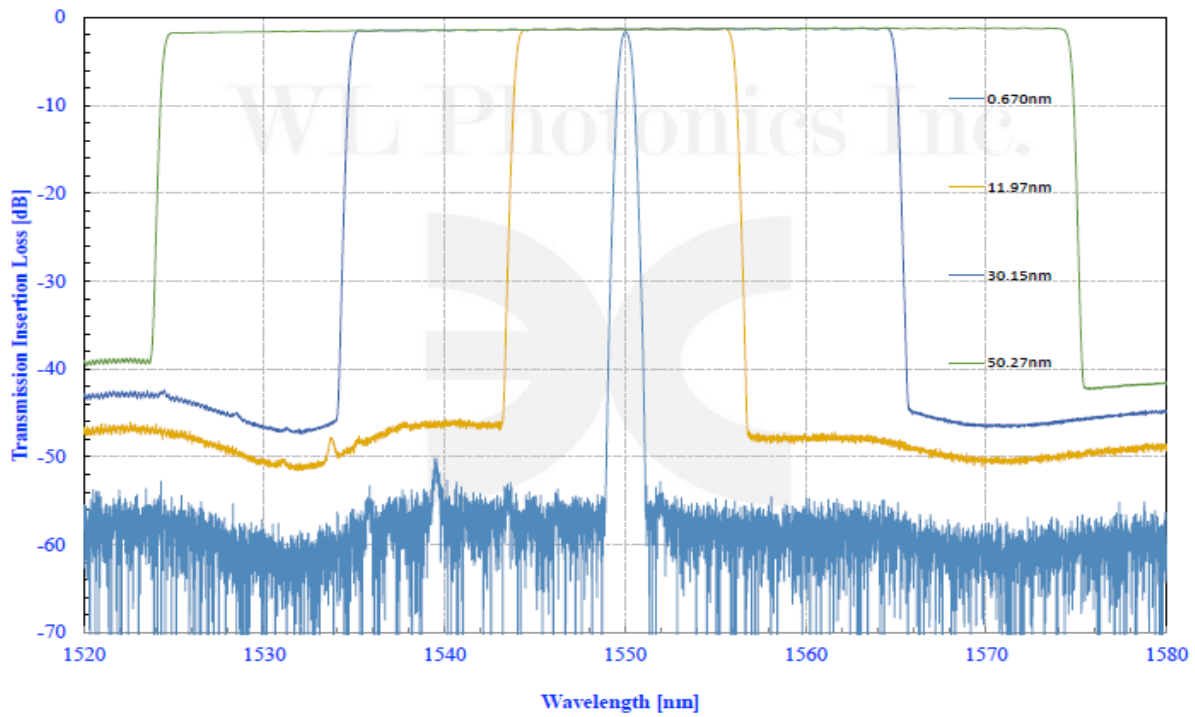


## Transmission Spectral Shape of Bandwidth-Adjustable Tunable Filter over 1500-1600nm

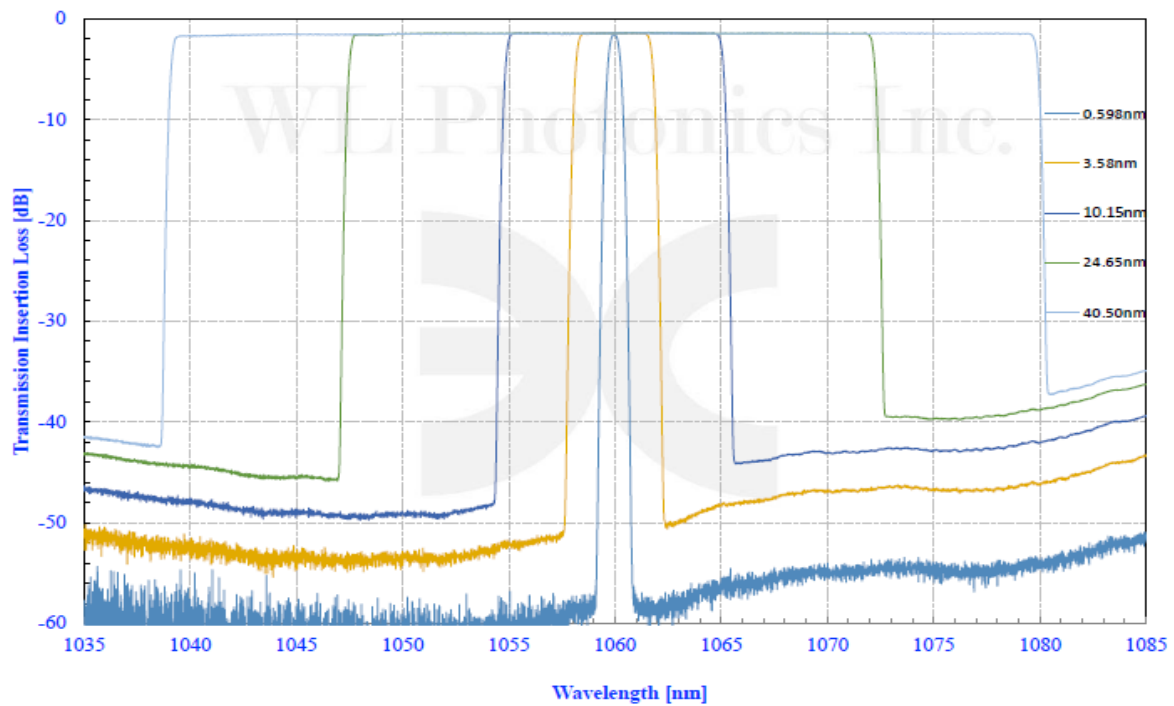


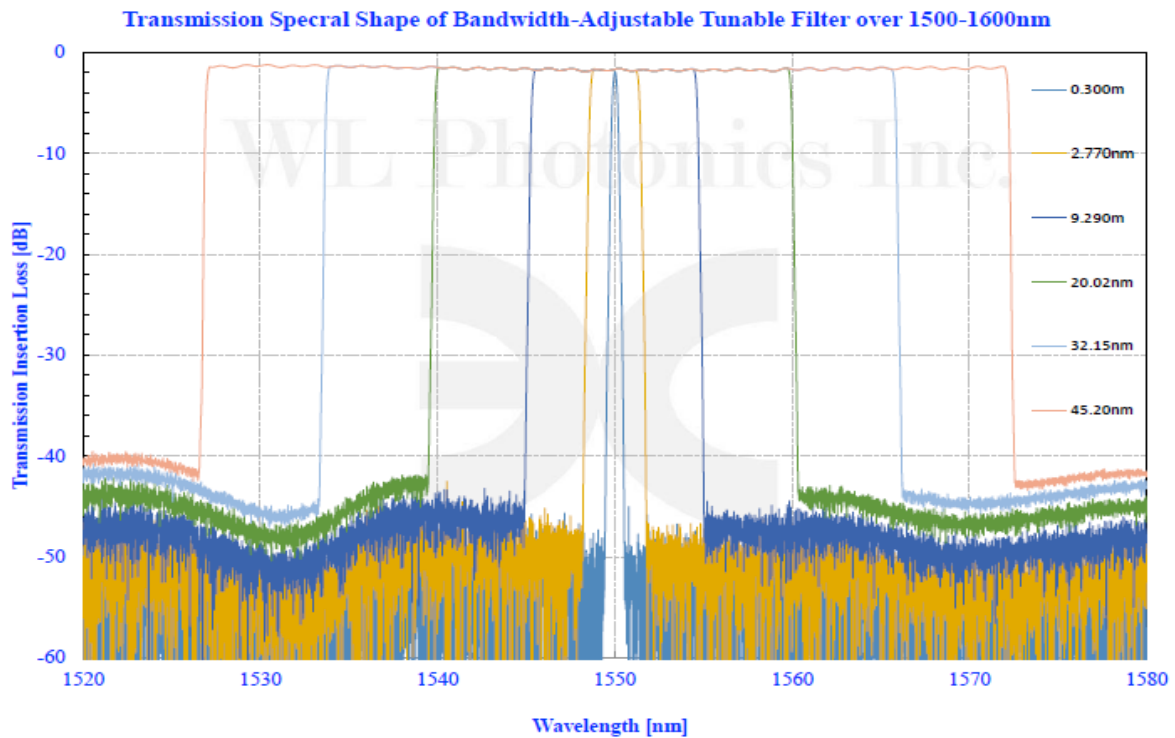
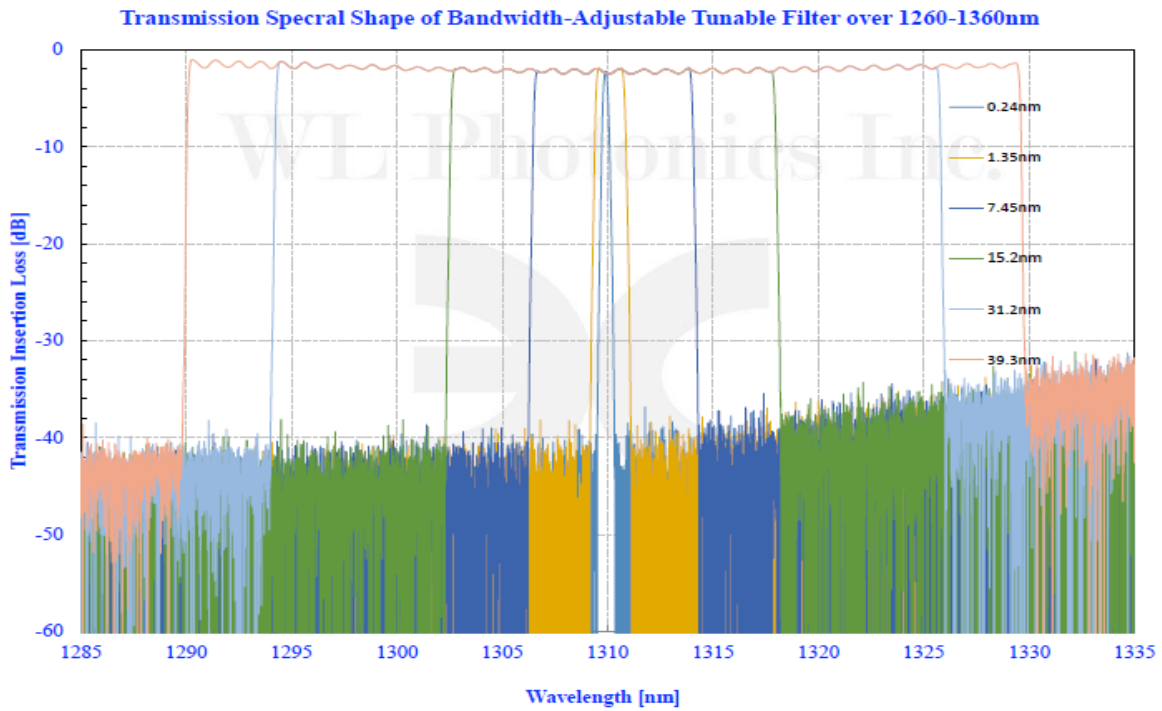


### Transmission Spectral Shape of Bandwidth-Adjustable Tunable Filter over 1500-1600nm



### Transmission Spectral Shape of Bandwidth-Adjustable Tunable Filter over 1020-1080nm







## Ordering Information

**Part Number of Manual Version: WLTF-BA-A-B-C-D-E/F-G**

- A. Version type: **S** is for S-version, **P** is for P-version and **U** is for U-version
- B. Center wavelength in nanometer: **1550** is for 1550nm center wavelength and **1310** is for 1310nm center wavelength.
- C. Tuning wavelength range in nanometer: **80** is for 80nm tuning range and **100** is for 100nm tuning wavelength range.
- D. Fiber type: **SM** is for single mode fiber and **PM** is for Panda polarization maintaining fiber.
- E. Pigtail cable diameter in millimeter: **0.25** is for 250µm OD buffer fiber, **0.9** is for 900µm OD loose tube and **3.0** is for 3.0mm OD cable (only existing for pigtail version).
- F. Pigtail length in meter: **0.5** is for 0.5m long and **1.0** is for 1M long (only existing for pigtail version).
- G. Connector type of either pigtail termination or receptacle adapter, such as **FC/APC**, **FC/UPC**, **SC/APC** or **LU/UPC** and **00** is for no connector.

**Example 1: WLTF-BA-S-1550-100-SM-3.0/1.0-FC/APC**

Description: S-version fiber optic polarization-insensitive manually bandwidth-adjustable tunable optical filter over 100nm tuning range centred @1550nm with 1M long, 3.0mm OD loose cabled SMF-28 fiber pigtails terminated with FC/APC connectors on pigtail ends. Bandwidth adjustable from 2.5nm minimum up to 40nm flat-top FWHM bandwidth, 22dB/nm filter edge rolling-off slope and 500mW (CW) optical input power.

**Example 2: WLTF-BA-P-1310-100-PM-3.0/1.0-SC/APC**

Description: P-version fiber optic polarization-sensitive manually bandwidth-adjustable tunable optical filter over 100nm tuning range centred with 1M long, 3.0mm OD loose cabled Panda PM1300 fiber pigtails aligned in PM slow axes (fast-axis blocking) and SC/APC connectors on pigtail ports. Bandwidth adjustable from 0.8nm minimum up to 40nm flat-top FWHM bandwidth, 60dB/nm filter edge rolling-off slope and 500mW (CW) optical input power.

**Example 3: WLTF-BA-P-1060-80-SM-0.9/1.0-FC/UPC-5.0**

Description: P-version fiber optic polarization-insensitive manually bandwidth-adjustable tunable optical filter over 80nm tuning range @1060nm center wavelength with 1M long, 900µm OD loose cabled HI1060 fiber pigtails and FC/UPC connectors on pigtail ends. Bandwidth adjustable from 0.6nm minimum up to 40nm flat-top FWHM bandwidth, 80dB/nm filter edge rolling-off slope and 5.0W (CW) optical input power.

**Example 4: WLTF-BA-U-1550-100-SM-3.0/1.0-FC/APC**

Description: U-version fiber optic polarization-insensitive manually bandwidth-adjustable tunable optical filter over 100nm tuning range centred @1550nm with 1M long, 3.0mm OD loose cabled SMF-28 fiber pigtails terminated with FC/APC connectors on pigtail ends. Bandwidth adjustable from 0.35nm minimum up to 40nm flat-top FWHM bandwidth, 100dB/nm filter edge rolling-off slope and 500mW (CW) optical input power.