Application Notes

Sterlite Tech

Low Water Peak vs Zero Water Peak Optical Fiber

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Abstract
This application note explains different terminologies related to water peak at tenuation of ITU-T G652D category optical fiber.

Keywords
Optical fiber, water peak

Reduced Water Peak performance of Single Mode Optical Fiber

The fiber optic industry has defined and established standards for water-peak performance of single mode optical fiber in its latest standards, ITU-T G.652D, and IEC 60793-2-50 B1.3. These standards require that the “water peak” attenuation at 1383 nm (after hydrogen ageing) should be equal or lower than that at 1310 nm. For typical attenuation of 0.34dB/km at 1310nm, the water peak attenuation is typically found to be in the range of 0.31dB/km to 0.34dB/km.

These Reduced Water Peak (RWP) fibers are considered Full Spectrum because the reduction of loss in the water absorption spectral region (the E band) allows transmission in this previously unusable portion of the spectrum. Table 1 shows various telecom optical wavelength bands such as 0, E, 5, C, L, from 1260nm to1625 nm, wavelengths currently considered in optical telecommunication systems.

Name	O	E	S	C	L	U/XL
Wavelength range (nm)	1260-1360	1360-1460	1460-1530	1530-1565	1565-1625	1625-1675
Note	Original band	Water peak band		Bands used by the higher performance systems		Not used

Tablel : ITU-T definition of telecom optical wavelength bands. the arrow stands for the wave length increase and the general trend toward higher performance systems

With full spectrum of 1310nm to 1625nm open for optical transmission, G652D fiber is a full spectrum single mode fiber. It combines previously untouched 1400nm region (E band) where water peak loss rendered G652B fiber useless. This opens an extra 100nm of transmission capacity, which can support at least four more CWDM channel than G652B fiber. This represents a channel gain of at least 33% for CWDM transmission.

What are Low and Zero Water Peak fibers?

While all RWP fibers have lower loss in the E band (1360 - 1460 nm), RWP fibers can be divided further in two types

1. Low Water Peak (LWP) fibers: These have lower loss in the water peak E band of the spectrum. The attenuation at 1383 nm is less than or equal to attenuation at 1310 nm. Typically attenuation at 1383 nm is <0.34 dB/km.

2. Zero Water Peak (ZWP) fibers: These eliminate loss at the water peak and further lower the loss across the entire spectrum. Not only is the attenuation at 1383 nm less than or equal to attenuation at 1310 nm, the visible water peak is eliminated. Typical attenuation at 1383 nm is <0.31 dB/km and between 0.27-0.31 dB/km

Both LWP and ZWP fibers are ITU-T G652D compliant fibers and the only difference between them lies in the attenuation at 1383 nm (water peak attenuation) as shown in Figure/. All other -specifications remain the same.

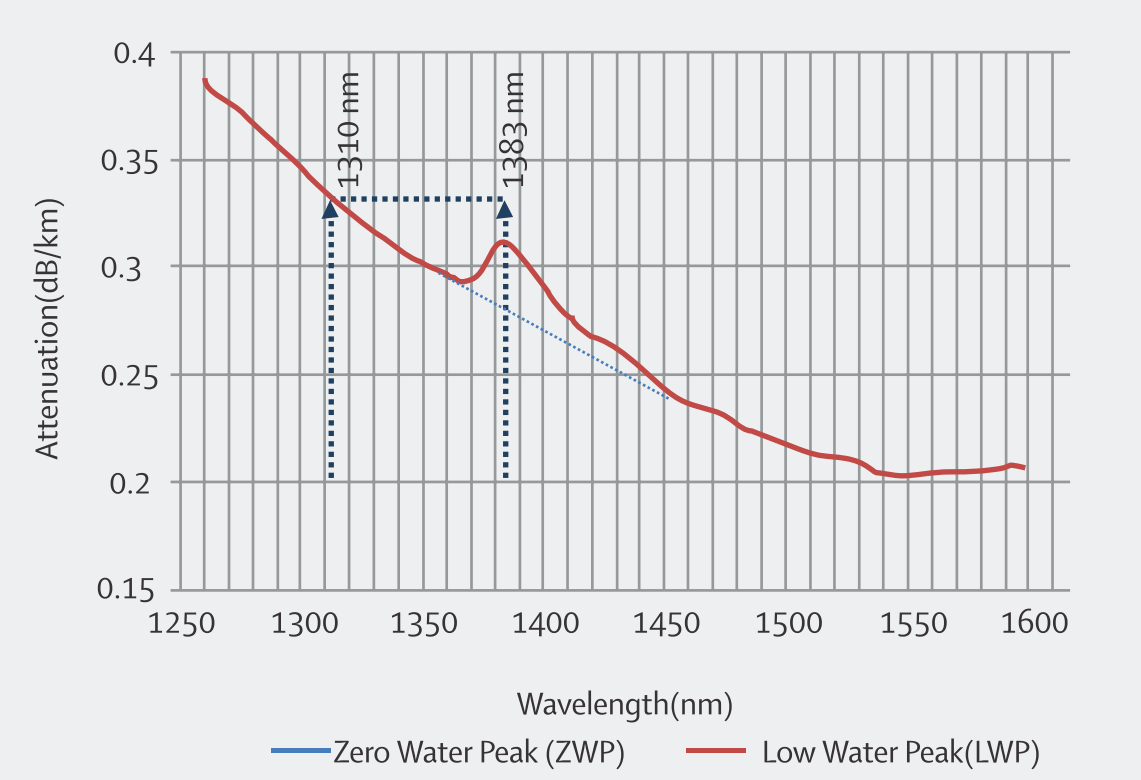

Figure 1 Typical Spectral attenuation plot of Zero and Low Water Peak fiber

Sterlite's OH-LITE® single mode optical fiber is complaint to both ITU-T G652D recommendation and IEC 60793-2-50 B1.3 standard and meets the requirements of LWP fibers. Sterlite's OH-LITE® Enhanced single mode fiber is compliant to both ITU-T G652D recommendation and IEC 60793-2-50 B1.3 standard and meets the requirements of ZWP fibers.