

## APC vs PC Connectors

Fiber connectors are not all the same. As well as the different physical types – such as SC, FC and E2000 – there is a big difference between APC and PC or UPC connectors. This difference is especially important when sending RF signal (as opposed to digital data).

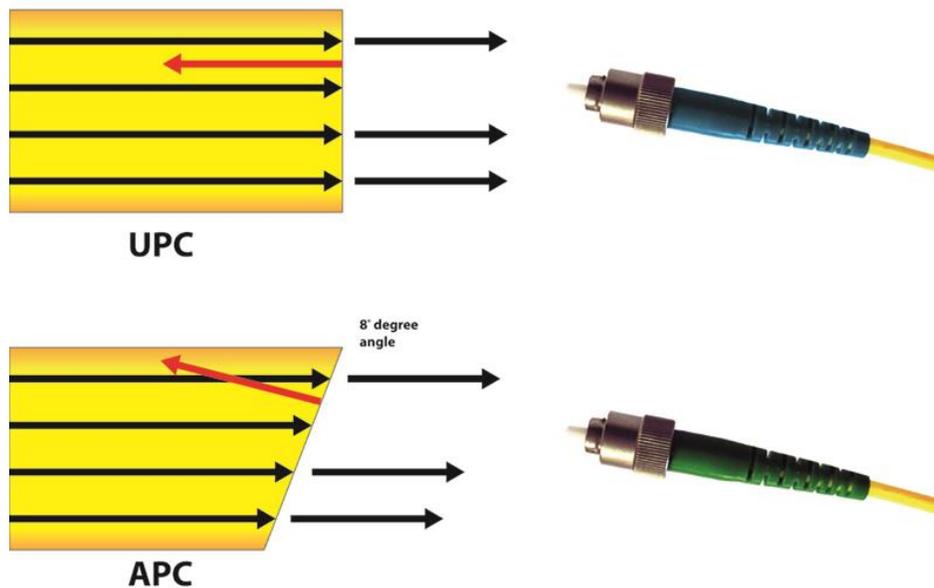
### What is the difference?

PC and UPC are flat connectors with a straight polished fiber. 'APC' is an angled polished connector; the fiber is typically polished at an 8-degree angle.

### Why are there APC connectors?

Firstly we need to explore what happens with the light in both connectors.

There is a slight mismatch in the alignment of two mating fibers in any connector and the polished nature of the fibers reflect the light back in the opposite direction. With a (U)PC connector, this light is reflected straight back into the source. With an APC connector, the angle directs the light off into the side walls of the fiber where it is absorbed by the fiber jacket. So the light in APC connectors does not return to the source.

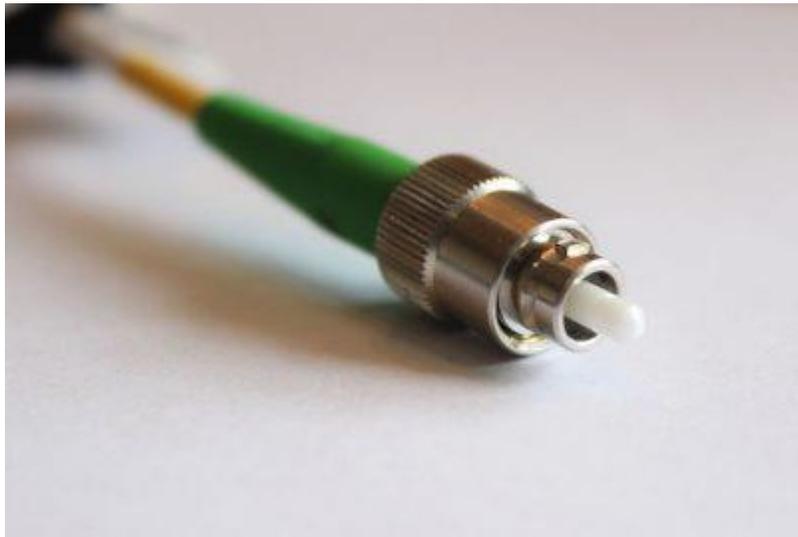


In digital applications there is no issue using PC and APC connectors as light can get through in an on-off manner. Even with reflected light, most of the light reaches the receiver and passes on the signal. With RF, however, the laser source is an oscillator which means any light fed back into the source introduces noise and affects the overall performance of the oscillating source. Therefore, APC connectors are used instead to stop reflected light going back into the laser.

## Is it just the Transmitter connectors that need to be APC?

No. As the laser light in the fiber travels the fiber's entire distance, if any of the connectors in the system are PC there is a risk that there may be reflections back. It is possible that due to the distance this is over, the reflected light can have dissipated by the time it gets back to the laser (the distance in a ViaLite system is approximately 10km). Therefore, if there is any chance of having a flat polished connector in the system, a double isolated laser needs to be fitted at manufacture. This isolator is effectively a wavelength specific one way mirror which ensures reflected light cannot get back into the laser source.

Another common problem can occur when U(PC) and APC connectors are mated together. This creates an air gap between the mating surfaces as one connector is angled and one is flat. This can cause losses in excess of 10dB in a single mismatched patch. Depending on the connector type it is also possible to damage the end of the angled fiber, with the flat fiber causing additional loss issues.



## How do you tell them apart?

It is quite simple to tell the connectors apart. APC connectors are green and PC connectors are either blue or black. The key thing to remember with RF over fiber is that green is good.

