

Connector Options in Fiber Optic Networks

AEN 127, Revision 2

This note provides information on the appropriateness of terminating with an APC, UPC, or PC connectors in Private Networks.

Types of Polish

There are three types of connector polishes presently used on fiber connectors. They include the Physical Contact (PC), Ultra Physical Contact (UPC) and Angled Physical Contact (APC). Back reflection values are used to distinguish between the different types. Back reflection represents the light reflected back to the source from a connector mating or other discontinuity in a fiber. It is the measure of light reflected off the polished end face of a connector. Reflectance performance for UniCam® connectors are controlled by use of a factory polish. It is very difficult to obtain low reflectance values with field-polished connectors.

To reduce back reflection and minimize loss, connector ferrule endfaces are polished to various surface finishes. The better the finish, the lower the reflectance value will be. Table 1 provides Corning Optical Communications' performance for single-mode and multimode connectors. A typical multimode polish (PC) is a flat finish of the contacting area and will measure at approximately -30dB.

Type of Polish	Reflectance	Boot Color
PC (multimode)	$\leq -30\text{dB}$	Black
UPC (single-mode)	$\leq -55\text{dB}$	Blue
APC (single-mode)	$\leq -65\text{dB}$	Green

Table 1

UPC and APC connectors are typically machine polished and measure at -55db and -65db respectively. The machine polish used to deliver low reflectance for UPC and APC connectors is a spherical geometry which ensures the mating fibers cores align at the apex, or high point, of the polish.

APC Market

Different types of applications can withstand various degrees of reflective loss. Angled Polish Connectors have historically been used for analog video type applications and specific single mode projects. It has been shown that video equipment in cable TV industry can tolerate a small amount of loss. The APC connectors are best for these types of high bandwidths because they offer the lowest amount of reflectance.

CORNING

Closed Circuit Television (CCTV) and security companies have historically used APC connectors in their enterprises. FTTH applications such as GPON networks also use APC connector's for their reflectance performance. APC's are no longer just used in specialty markets since they are quickly becoming the standard in outside plant fiber networks.