

FieldSmart Fiber Delivery Point (FDP)

Fiber Management for the Access Network



Passives in the Outside Plant: Access - The Last Mile

The last mile to the home (often referred to as the Access Network) is where the access point or "drop" is accomplished within FTTH networks. The access point, providing splicing or interconnect functionality, can be placed aerially in pole or strand-mount closures, pedestals on the ground, or below grade in small hand-holds with closures. While the aerial or ground-mount options may or may not be sealed, the below grade option must be sealed to ensure against moisture entering the closure. Once the access method is chosen, all must provide the physical connection between it and the customer premise. Terminated drop cable assemblies are chosen using several termination methods. Whether single or double-ended, the drop cable is usually of a flat construction with two strength members running parallel to a single buffer tube of 1 to 12 fibers or of a single tight buffered outside diameter around 2.0mm. This cable can be chosen with or without a tracer for locating purposes.

The widely pushed termination standard for this drop cable assembly is the HFOC (Hardened Fiber Optic Connector) and is meant to provide an environmentally protected and hardened interface using a SC or LC connector body. Choosing this interface locks the user into providing the mating adapter either at the access point or at the customer home (often called the ONT). (In some deployments a mating adapter is called out at both points, although a double-ended assembly such as this, means that careful planning, time, and resources be expended to ensure the correct lengths are used for each and every home.)

This mating function with HFOC at the access point is accomplished through a hardened termination distribution system where the distribution cable is spliced into it at the access point or a pre-terminated stub is interconnected somewhere into the distribution cable in another hand-hole away from the access point with a hardened multi-fiber connector like an MTP/MPO. Both methods provide the physical link to the upstream distribution network, typically the fiber distribution hub (FDH).

The drop cable is then aerially lashed, pulled through conduit, or direct buried to the customer home and mated with a terminated end or it is spliced. The reverse is often chosen where the splicing of drop to distribution cables is performed at the access point and the terminated HFOC interconnects at the home. This is, generally, the most costly method for deploying drops. Additionally, engineering resources are used and the engineering must be done to very tight tolerances to ensure that everything "reaches." One mistake at an access point, in length, can result in delays waiting for the correct assembly.

An equally deployed method is mating a terminated drop with an industry standard connector at the access point and then either hard-splicing the other end to the customer ONT or splicing to an industry standard pigtail. Or, as with HFOCs, the reverse can be done with the terminated end at the ONT and splicing done at the access point. The advantage of this methodology is that it allows for exact lengths for slack storage to be accomplished at each and every drop. This is a cost-effective and simple method that does not increase the risk of excess inventories. The argument that splicing is expensive and difficult to do in-field is negated with today's efficient handheld splicing machines designed for this application as well as the use of mechanical splicing hardware that yield high performance on par with traditional splicing.

The Simpler Alternative

Clearfield customers have used the HFOC as well as the standard connector in their deployments. Clearfield prefers the use of the standard connector as it is far easier to deploy than the HFOC and we have witnessed minimal to no reduction in reliability through its use.

To expand upon this ease of use, cost savings and reliability, the Clearfield design team set out to design a solution that incorporates splicing within the pedestal—and then goes a step further by incorporating the protection of a Clearview Cassette. With a Clearview Cassette inside a pedestal of the service providers' choice, a pre-terminated drop cable can then be mated to the cassette adapter outputs and finished off at the customer home with a splice to a terminated SC or LC pigtail. Since the Clearview Cassette is the identical fiber management protection used in other parts of the outside plant as well as the central office, the packaging is familiar to the technician and install times are reduced. (While splicing of pigtails at the ONT is cost-effective, care should be taken to use jacket material that responds well in harsh environments. Clearfield ruggedized patch cords or pigtails are designed with a MIL-SPEC rated cable that remains flexible down to 40 degrees below zero ensuring that the cable will be routed correctly and will perform through hot and cold temperatures.)

There are many opinions about whether to use flood proof, sealed, or non-sealed pedestals at the access point. All Clearfield solutions provide the ability to provide mid-span access as large count cable can enter and leave a pedestal while handing off the necessary fiber to serve the desired homes at the access point. Interconnect or splice only options are available to suit the customer need.