

AFL Taut-Sheath Splicing LG-420 Fiber Optic Closures

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General

With the Telco broadband deployment starting to take off, network builders are looking for more cost effective methods of providing customer access in the “Last Mile” fiber deployments. Whether the deployment topology is using Fiber to the Home (FTTH) or Fiber to the Node (FTTN), a significant cost consideration is how to address anticipating where your future customer are going to be along the route. Specifically in aerial outside plant “Brownfield” deployments, those FTTX deployments that are overbuilds of existing customers and embedded copper plant, AFL/Keptel has a unique fiber optic splice closure system the provides significant cost saving for the network builder. This cost saving fiber optic splice closure system is known as Taut-Sheath splicing. The intent of this application note is to provide insight and understanding of the advantages of the AFL Lightguide LG-420 Taut-Sheath splice closures.

LG420 Taut Sheath Splice with AFL Aerial Workstation

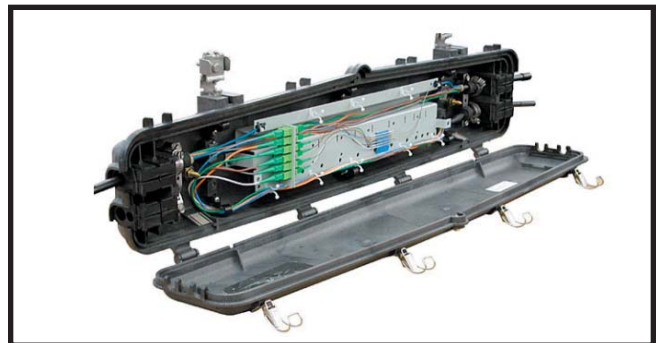
The AFL Lightguide LG-420 splice closure is classified as an aerial “Fiber Optic Breathable” (FOB) closure by the Telcordia GR-771 and the RUS 515 standards. This means that the closure is a vented breathable closure, that has the same temperature and relative humidity inside the closure as outside the closure, and thus cannot condense the moisture in the air causing water to form in the closure. This is true even at 95% relative humidity. AFL/Keptel are the original inventors on FOB type closures in 1988, and were the first to request changes in the fiber optic closure standards to address this type of technology. A further evolution of FOB closures was the development of splicing closures that required no excess cable slack to facilitate access to the backbone or distribution cable. This type of closure is known as a taut-sheath splicing closure system. Taut-sheath means there is no cable slack or excess cable necessary to facilitate getting fiber slack to splice to a branch fiber cable or fiber drop cables.



AFL Taut-Sheath Closure LG-420-U-0

What will the AFL Taut-Sheath closure do?

The AFL Taut-Sheath closure will accommodate cable diameter up to 0.77” in diameter in the express entry port. This means that cables as large as 144 fiber to 216 fibers will fit into the fiber optic closure. It provides a method of opening up a buffer tube and splicing 12 fibers to either a branch cable, or to 12 single fiber drops with no additional cable slack required to facilitate splicing. Splicing is only required on the actual fibers desired to be sent to drops or access cables of lower fiber count.



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Network Cost Savings

AFL Taut-Sheath fiber optic closure offers a significant opportunity to reduce the material cost of customer access to an aerial fiber optic network. By not having to pre-plan the access points for customers, and leave excess cable stored in cable coils or in loops with snowshoes, a significant savings can be realized. Additional savings can be realized by not having to relocate the excess slack to a terminal node point when it is not nearby. In traditional network the network designer must plan to place snowshoes and 100 to 150 feet of cable slack every 1000 to 2000 feet or a 6-foot coil of excess cable is located on every other pole. When a new end customer request service the network designer must locate the nearest slack coil or excess cable and either “cut in” a closure to provided access or move the excess cable back to the required location by de-lashing the cable and moving the excess cable back to the location need to provide service to the new end customer.

Fiber Optic Cable Slack Stored in Snowshoes

The cost savings of not having to store excess cable or slack coils can be significant in a network cost. Making the basic comparison of the cable slack storage verses using a AFL Taut-Sheath fiber optic closure to cost savings can be as high as 45% to 63% saving in the cost of customer access points. The larger the fiber optic network considered in this comparison the greater the savings in materials and labor. Figure 1 depicts how this “cost to access” is compared.



How Does Taut-Sheath Closures Work?

The AFL Taut-Sheath fiber optic closure works by utilizing the inherent excess fiber length in the fiber cable that is provided by the helix factor of the buffer tubes. All manufactures of multi-buffer fiber optic cables utilize a cable core configuration of Reverse-Oscillated-Lay (ROL) in their cable construction. This is where the buffer tubes spirals around the cable core in one direction, then reverses and go the opposite direction for the same period. The reversal of direction takes place every 18 to 24 inches depending on the cable manufacturer and the number of buffer tubes or fiber count. By utilizing this transition point, excess length of buffer tube can be developed to facilitate splice of a specific tube while letting the rest of the cable core pass through the closure.

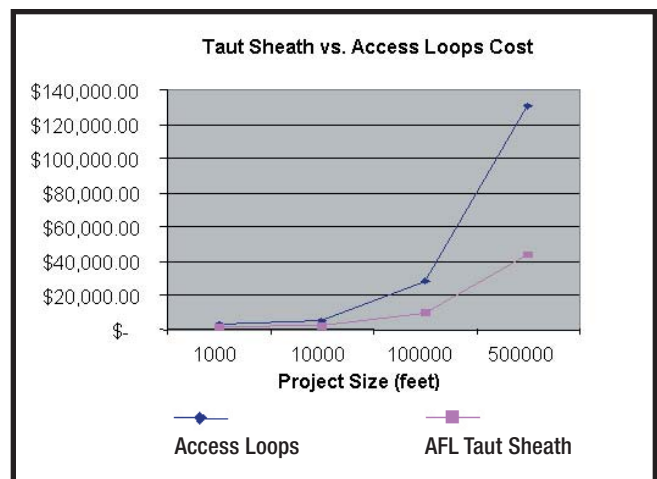
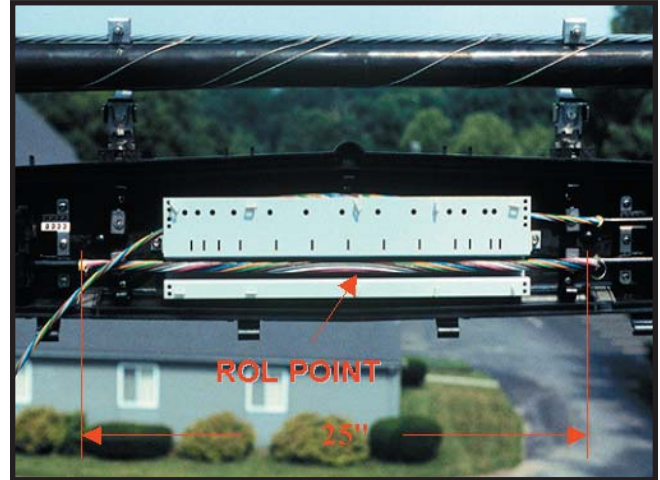


Figure 1

ROL Point of the cable in the Taut-Sheath Closure

Building a Taut-Sheath Splice

Once the cable splicer determines the location of the splice point, the Taut-Sheath closure is hung on the cable support messenger. The existing cable lashing wire is detached above the closure then re-terminated with new lashing wire clamps approximately 12 to 18 inches each side of the closure. The cable will then bag down from the messenger. The cable closure is opened and the cable entry grommets are removed. The cable entry grommets of the LG-420 optic closure utilize a patented Weathertight grommet technology specifically developed for aerial FOB closures. This special grommet requires no special tools and is range taking for various diameter cables. The LG-420 has four (4) cable entry ports that are for the express or main cable and the branch or drop cables.



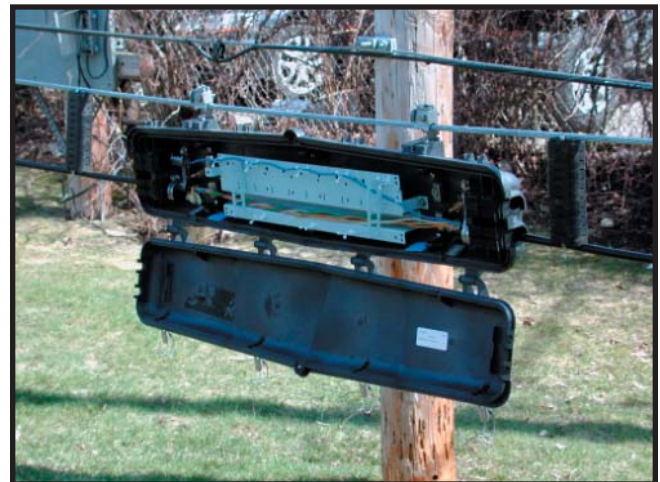
The cable sheath is marked and then 25 inches of cable jacket is removed to expose the cable core. In this opening will be one ROL point in the cable core. The entry grommets are opened and sized to the cable and positioned into the closure. The cable is then clamped into the closure using the cable retention clamps and hardware. The central strength member is left intact and passes with the cable core through the channel of the Taut-Sheath plate.

Once the express cable is secured the buffer tube to provide fiber is identified by its color code. The buffer tube is then cut at the furthest point to the field to provide approximately 27 inches of buffer tube. The access buffer tube is then measured, ring cut, fibers cleaned then terminated to the Taut-Sheath plate.

Express Cable Secured and the Access Buffer Cut

The drop cable or branch cable is then prepared by stripping back approximately 48 inches of cable to the core of the drop or branch cable. The cable is then terminated into the cable retention clamps and central strength member clamps and secured into the closure through the weathertight grommet. The buffer unit is then secured to the Taut-Sheath plate and the fibers cleaned and prepared for splicing.

Once the fiber are cleaned and prepared for splicing the technician must organize the fiber on the plate and determine the location to adhere the splice retainer chip. The remaining fibers desired are then spliced in the same manner. This entire process typically takes no more than 30 to 40 minutes total.

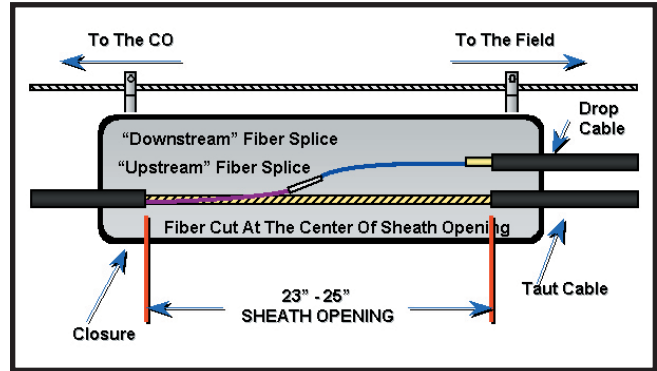


ROL Point of the cable in the Taut-Sheath Closure

Express Cable Secured and the Access Buffer Cut (continued)

In situation that an access point is desired, 900um connectorized pigtails can be spliced in with pre-terminated SC/APC or SC/UPC connectors. A bulkhead plate is provided that the corresponding bulkheads can be mounted. This provides either a test access point or the opportunity to use pre-connectorized drops.

In fiber to the home applications a special version of the Taut-Sheath closure has been developed called the LG-420-FTTH. This special version has all the features and benefits as the standard Taut-Sheath closure but also provides the ability to address up to twelve individual drops and independent cable retention and provides a lock out to segregate the terminal assignment fiber splicing from the preconnectorized drops.



LG-420-FTTH Taut Sheath Closure

Conclusion

The AFL Taut-Sheath splice closures LG-420 can save considerable time and cost in building access networks. The flexibility of not having to pre-plan access points and reposition cable to provide new customer access is an attractive option. In using LG-420 splice closures terminals, cut in time is considerably and you are able to provide quicker more cost effective access to FTTH networks. This allows network builders to realized quicker payback on network deployments.

