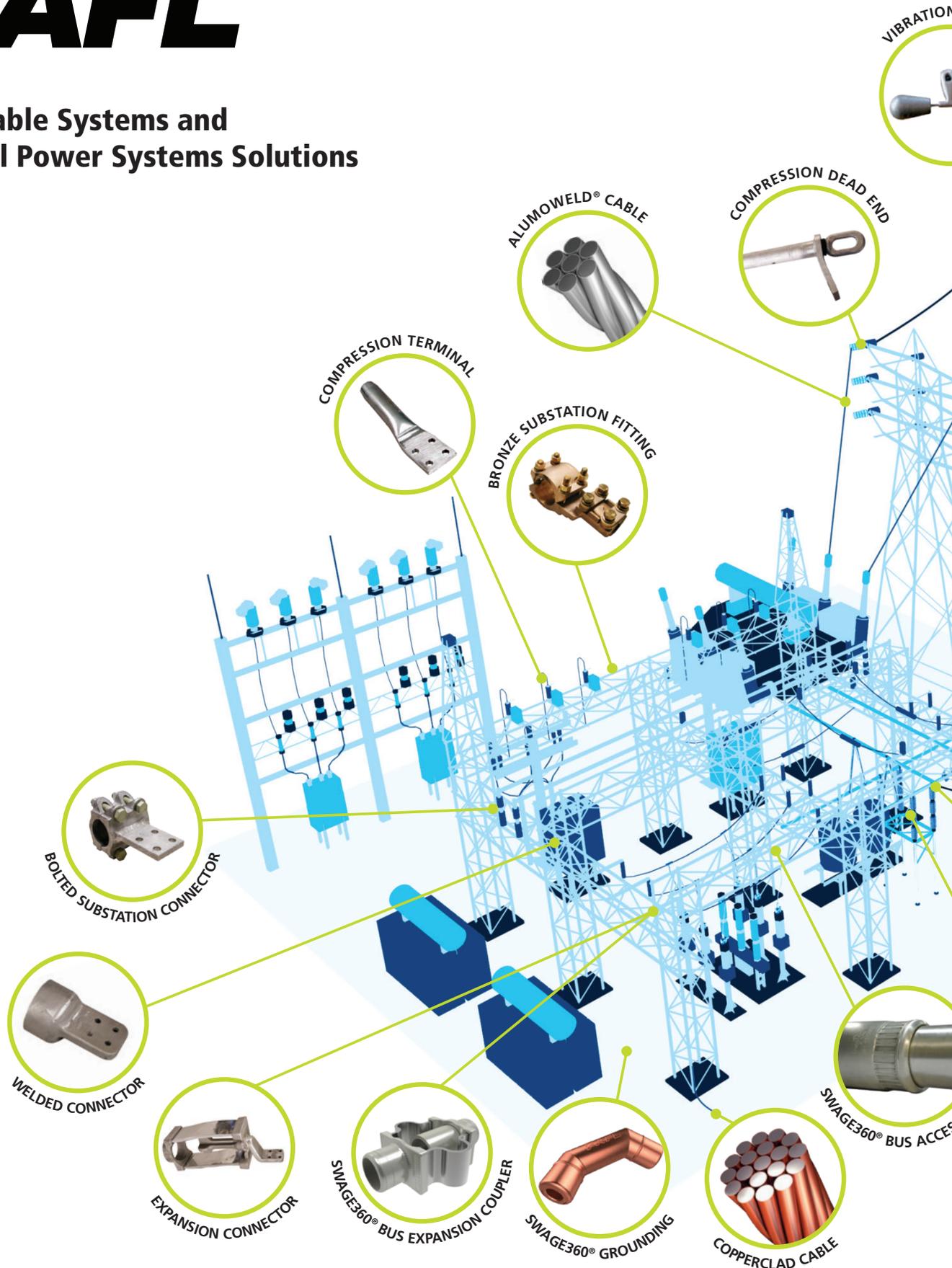




**Fiber Optic Solutions
for Electric Utilities**



Aerial Cable Systems and Electrical Power Systems Solutions



N DAMPER



SPIRAL VIBRATION DAMPER



HIBUS® CONDUCTOR



SPEED GRIP SPACER



IMPACT® DEAD END



QUAD CLAMP



SPACER DAMPER



HIBUS® SUSPENSION



STIRRUP CLAMP



HIBUS® TRUNNION



SWAGE360® CABLE ACCESSORIES



BRONZE SUBSTATION FITTING



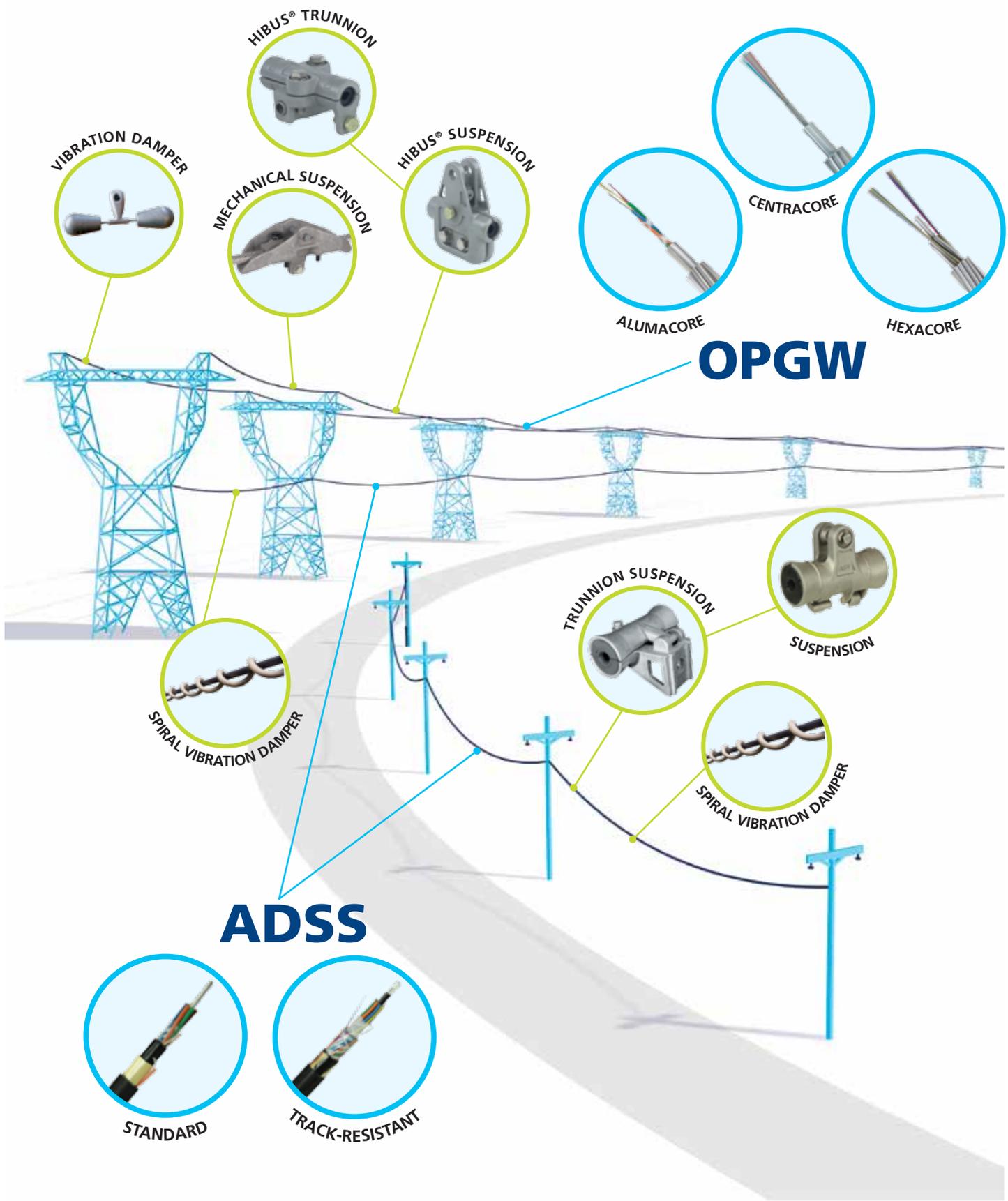
PG CLAMP



SPIRAL VIBRATION DAMPER



SSORIES



ADSS

OPGW

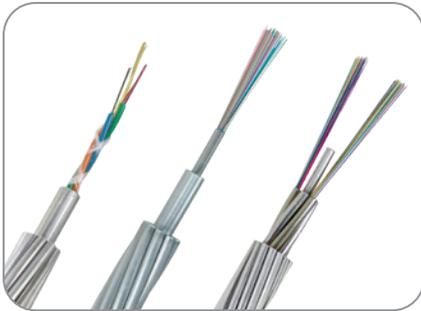
AERIAL CABLE AND ACCESSORIES

For more than 30 years, AFL has provided electric utilities with aerial cable systems that include OPGW and ADSS fiber optic cable plus associated attachment hardware. But do you know that AFL is the only provider that offers a complete end-to-end passive solution to meet your fiber needs?

Whether you need to operate a SCADA network, or AMI systems, or to build-out a central office within a substation, AFL has the diverse product portfolio to help electric utilities deliver new solutions to customers.

In addition to our substation and transmission/distribution solutions, AFL's end-to-end portfolio includes fiber optic cable, field-installable connectors, fiber management systems, fusion splicing systems and test and inspection equipment. A sampling of these solutions is featured here.

OPGW Cable



Optical Ground Wire (OPGW) is primarily used by the electric utility industry, placed in the secure topmost position of the transmission line where it "shields" the all-important conductors from lightning while providing a telecommunications path for internal as well as third party communications. AlumaCore, CentraCore and HexaCore comprise AFL's broad OPGW fiber optic cable product line. The correct OPGW configuration is critical and specific to each unique application. AFL's Applications Engineers can assist with determining which design best suits the unique conditions and challenges for each opportunity.

OPGW Vibration Damper



Vibration Dampers work to cancel damaging fatigue caused by wind-induced vibration. Most tuned damping devices operate best near their natural frequencies. AFL vibration dampers are designed for efficient transfer and dissipation of energy over a wide spectrum of frequencies. They feature all aluminum clamp construction to match expansion/contraction of conductor and break-away bolts for easy installation and proper torque.

OPGW Mechanical Suspension



The unique design of AFL's lightweight Mechanical Suspension supports spans of OPGW cable through a wide range of line angle changes. AFL's Mechanical Suspension installs easily while supporting vertical, transverse, longitudinal unbalanced loads and angle pulls without damaging the cable strands or affecting optical fiber performance.

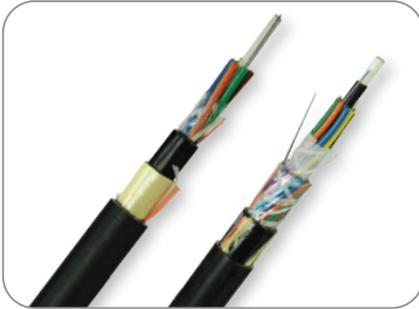
OPGW Suspension Unit



HIBUS® suspension units are designed to reduce the static and dynamic stress at the attachment point on all types of OPGW fiber cables without the use of protective rods. It's unique bushing system allows the OPGW cable to better withstand the effects of aeolian vibration. The hinged concept on the suspension configuration provides self alignment of the housing halves. All of the hardware is captive except for the attachment pin.

Aerial Cable and Accessories

ADSS Cable



AFL-ADSS® (All-Dielectric Self-Supporting) cable is ideal for installation in distribution as well as transmission environments, even when live-line installations are required. As its name indicates, there is no support or messenger wire required, so installation is achieved in a single pass, making ADSS an economical and simple means of building a fiber optic network. When live voltages reach 115 kV or higher, AFL's applications engineers can assist in determining if a Tracking Resistant Jacket is required and provide a recommended placement of the cable.

ADSS Trunnion



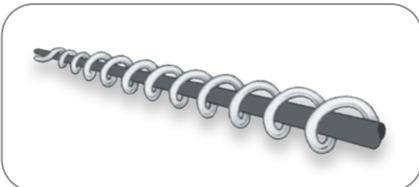
AFL offers ADSS trunnions with various mounting capabilities: bolted, banded or standoff. Trunnions reduce installation costs by functioning as a pull-through during installation (maximum line angle for stringing is 15° total, 7.5° per side, number of structures not to exceed 30). Block or pulley is not needed, provided these conditions are met. The ADSS trunnion is available in both a single and double configuration allowing for up to two cables to be supported in tangent by a single unit. A trunnion option is also available for OPGW.

ADSS Suspension Unit



ADSS suspension units are rated for 1200 ft. NESC Light and 600 ft heavy load. The interlocking halves of the aluminum body clamp provide positive alignment and utilize our proven EDPM bushings to gently grip the cable. ADSS suspension units can be kitted for an oval eye nut and anchor shackle. The suspension units have a 30 degree line angle rating and a vertical loading rated at 5,000 lbs.

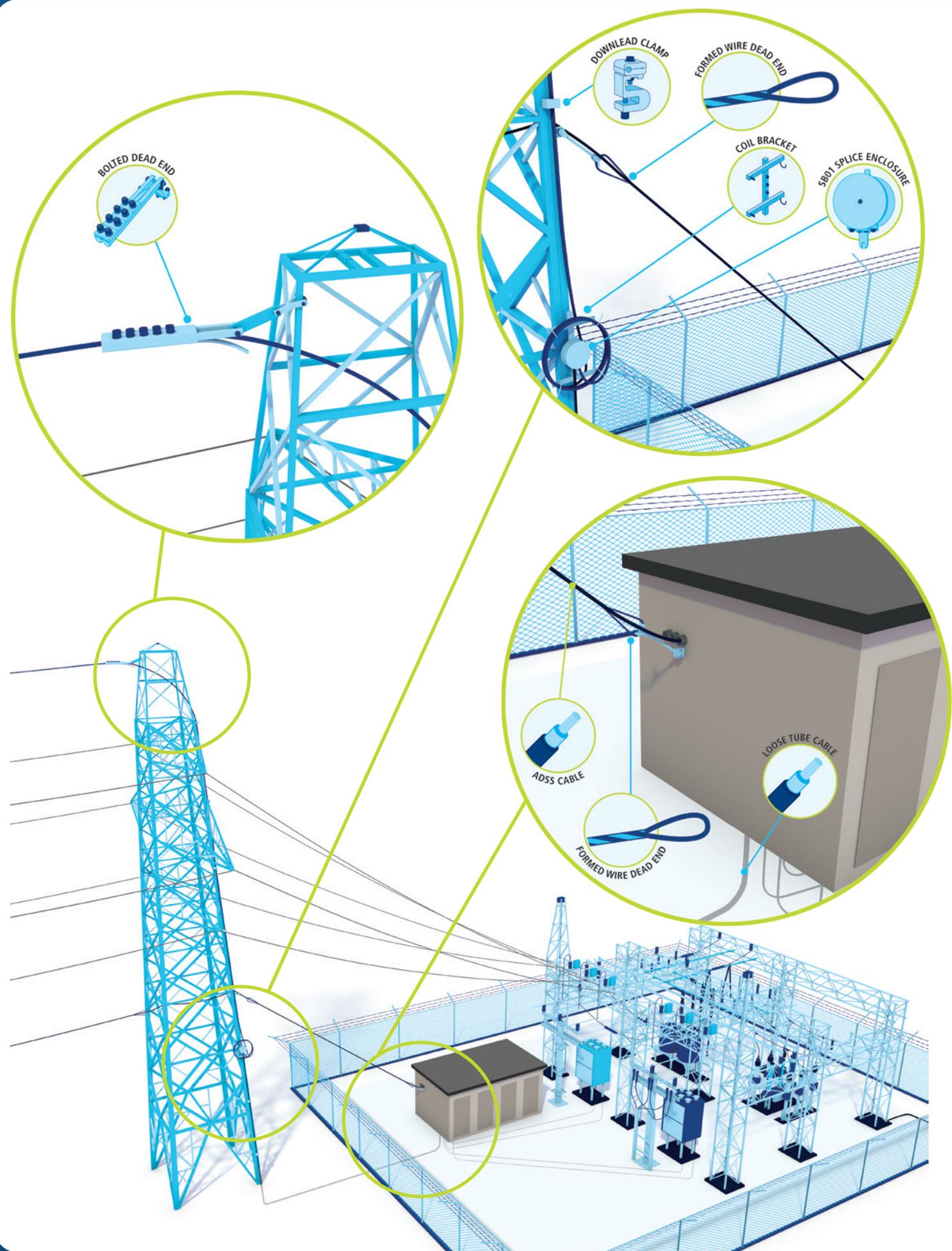
ADSS Spiral Vibration Damper



Spiral vibration dampers have a helically-formed damping section sized for interplay of damper and cable to provide the action/reaction motion that opposed the natural vibration wave. The placement location of the damper is not critical, the damper is effective wherever it is installed on the cable. No installation tools are required to install the damper and the damper is color coded for easy range identification.



AERIAL CABLE AND ACCESSORIES

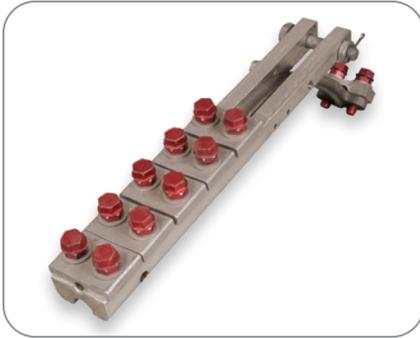


TRANSITION INTO SUBSTATION

TRANSITION INTO SUBSTATION

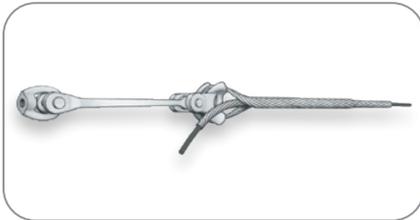
When the last structure before the substation is reached, OPGW and ADSS cables are dead-ended and securely guided down the structure with downlead clamps. OPGW will need to be spliced to a dielectric cable, either ADSS or Loose Tube, prior to entering the substation whereas ADSS can go in directly. Additional slack storage can be stored on coil brackets mounted to the structure.

OPGW Bolted Dead Ends



AFL's Bolted Dead End is a full-tension termination for OPGW cable with sustained load equivalent to 95% of cable RBS. Breakaway head bolts are used to apply a precise gripping force to hold the cable without affecting optical fiber performance. An optional cable guide is recommended to train OPGW down or around structure. Since it is shorter than formed wire dead ends, installation can be performed from the support structure.

ADSS Formed Wire Dead Ends



Formed Wire Dead Ends have been proven in the field over and over. They are the most common dead end product for ADSS. Formed Wire Dead Ends are kitted with an Oval Eye Nut, Extension Link and Thimble Clevis making them adaptable to most jobs. They have a maximum rated load of 7,500 lbs. and are components-rated for 15,000 lbs.

Downlead Clamp



Downlead Clamps are used to guide cables from the top of the structure to the splice box. AFL's Downlead Clamps install easily and provide proper spacing and hold strength without damage to the cable. From poles to towers, AFL offers a full line of Downlead Clamps to meet the needs of any application.

Splice Enclosures



The SB01 splice enclosure box provides protection from all types of elements. From weather to bullets, the iron and steel construction requires no additional protective covering. Furnished with four plugged cable ports (2 aluminum and 2 plastic) for Optical Ground Wire (OPGW), All-Dielectric Self-Supporting (ADSS) or Loose Tube cables. The splice enclosure can be pre-mounted to a structure before completion of the splicing phase.

Transition into Substation

Apex™ Sealed Splice Closures



Apex sealed splice closures are designed for protecting optical fiber splices in both above- or below-grade applications in a butt configuration. The Apex X-2 is capable of up to 432 single fusion, 864 mass fusion with standard ribbon, or 3456 (200 μm , 1728 max for 250 μm) mass fusion with ribbon fiber types such as AFL's SpiderWeb Ribbon® (SWR®). The Apex X-2S is capable of up to 216 single fusion, 432 mass fusion with standard ribbon, or 1728 (200 μm , 864 max for 250 μm) mass fusion with ribbon fiber types such as AFL's SWR.

Cables are sealed by a unique wedge system spaced evenly around the circumference of the closure's base. Each cable seal is opened by a press-to-release lever and sealing is completed by actuating a single screw for each cable. Each cable is sealed individually, ensuring original craftsmanship when cables may be added at a later date. Up to 6 splice trays are attached and hinge off a central organizer. A plastic slack storage basket resides underneath the trays with ample tie down points for managing tube and fiber slack.

Coil Brackets



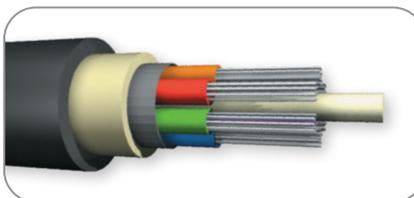
Coil Brackets are used to store additional lengths of OPGW and ADSS cable to help move closures to ground level for easy access. They are constructed of lightweight aluminum material and are very easy to handle. The brackets are shipped in three pieces and have alignment grooves for faster installations. They can be bolted or banded and can be used with all AFL splice closures.

Fiber Storage Units



AFL Fiber Storage Units (FSU) are used to conveniently store an extra length of cable along the ADSS cable run for later use. Furnished as pairs (kit contains two Fiber Storage Units and two sets of hanger brackets), these FSUs are constructed from UV stabilized PPE thermoplastic. All basic hardware for attachment to the ADSS cable is provided. ADSS cable mount support brackets meet Telcordia® specifications. Epoxy coated clamping devices meet ASTM specifications A153 and B695. The mounting bracket features an angled, tent-profile, epoxy-coated bracket for standard ADSS cable mounting.

Loose Tube Cable



AFL's Loose Tube family of fiber optic cables is designed for outdoor and indoor/outdoor use as the network backbone whether it is for aerial lashed or underground applications. Designs are available with gel-filled or gel-free, color-coded buffer tubes. Most common are the Non-Armored Loose Tube cables where the S-Z stranded tubes are contained within a single or double jacket configuration. Available with up to 576 fiber counts.



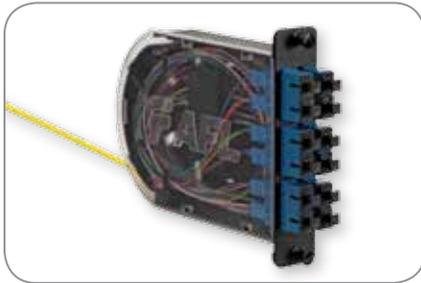
TRANSITION INTO SUBSTATION



INSIDE CENTRAL OFFICE

Inside the Central Office is where the fibers are terminated and tied into any active equipment in the electric utility's system. It is also a great location to certify and troubleshoot the fiber network. Cleaning is of the utmost importance here as well—as dirty connectors lead to a majority of network outages. Highlighted below are just a few products AFL offers to simplify navigating the central office.

Poli-MOD® Patch and Splice Module



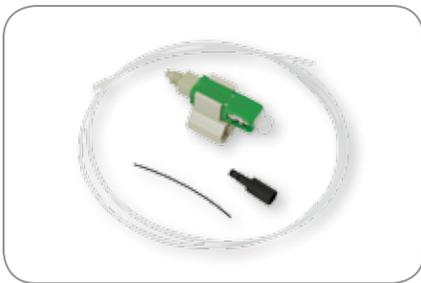
AFL's Poli-MOD is an innovative patch and splice module, which offers an inventive and effective means to accommodate up to 24 fiber interconnections in an industry-standard, single-slot LGX®118 footprint. The Poli-MOD offers a unique and robust way to secure cable without the need for time-wasting, tie-wrap alternatives. Additionally, the module leverages a creative snap-in splice sleeve cradle to securely manage both single and ribbon fiber arrangements. These features provide the capacity to outfit a standard 4RU rack-mount panel with up to 288 fiber interconnections.

XFM® Patch Panels



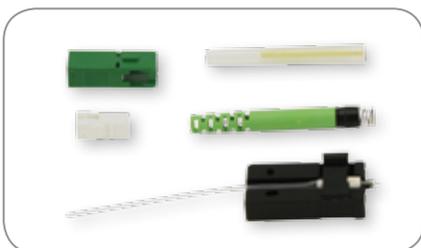
Xpress Fiber Management® (XFM) patch panels are rack-mountable interconnect points designed to manage dense fiber applications. The panels are fully compatible with AFL's XFM optical cassette, passive optical coupler modules and Poli-MOD solutions.

FASTConnect® Mechanical Connectors



FASTConnect field-installable connectors are factory pre-polished connectors that completely eliminate the need for hand polishing in the field. Proven mechanical splice technology ensuring precision fiber alignment, a factory pre-cleaved fiber stub and a proprietary index-matching gel combine to offer an immediate low loss termination to either single-mode or multi-mode optical fibers.

FUSEConnect® Splice-On Connectors



FUSEConnect fusion-spliced, field-installable connectors are uniquely designed and feature only four-to-five components. The factory pre-polished ferrule eliminates the need for polishing, adhesives and crimping in the field, which minimizes the potential for operator error and expensive connector scrap.

90S Fusion Splicer



The 90S is designed to give you high quality splices and to stay in the field. The 90S can be utilized in any field splicing application seen today: bend-insensitive fibers in drop cables, long-haul terrestrial and submarine LEAF fibers, loose buffer fiber, splice on connectors, and the list goes on. The speed and accuracy of the 90S even make it suitable for certain production and specialty environments, where high output, tight packaging, and low loss requirements are needed. Regardless your scenario, the 90S is designed to keep you going with an extended battery life of 300 splice and heat cycles, and by alleviating the need for traditional operation tasks such as; frequent arc calibrations, cleaver blade rotations, cleaver usage tracking, and manual splicing operations with its multiple automated and ease-of-use features.

FlexScan® FS200 Single-mode OTDR



FlexScan FS200 single-mode OTDRs automate test setup, simplify results interpretation, and shorten test time. AFL's SmartAuto® mode requires just the push of a button to test the network. Results are clearly displayed on the large touchscreen using color-coded LinkMap® icons that show network configuration and pass/fail status at a glance. Our new Flexpress® mode completes dual-wavelength tests in under 5 seconds – 10 x faster than other OTDRs.

The integrated light source, power meter and VFL, along with an optional connector inspection scope, provide both expert and novice technicians everything they need to locate and resolve optical network issues. Results may be stored internally or externally and easily shared via USB or Bluetooth. Included Windows-compatible TRM 2.0/3.0 Test Results Manager software quickly generates easy-to-understand reports. The results used for TRM reports can be transferred from FlexScan by USB cable or wirelessly via the FlexScan App.

TRM® 2.0/3.0 Test Results Manager



TRM Test Results Manager is PC-based software that provides comprehensive test results analysis and reporting for AFL test and inspection products. TRM Basic software enables users to quickly view loss or certification results, batch-edit OTDR traces, and create acceptance reports conforming to industry guidelines. TRM Basic can generate reports showing dual wavelength traces and event tables, end-face image, event map and loss data for each fiber. Users can apply pass/fail thresholds to OTDR events and OLTS measurements, and create and apply application rules per industry standards. TRM's OTDR Batch Editor enables users to edit and analyze multiple trace files simultaneously.

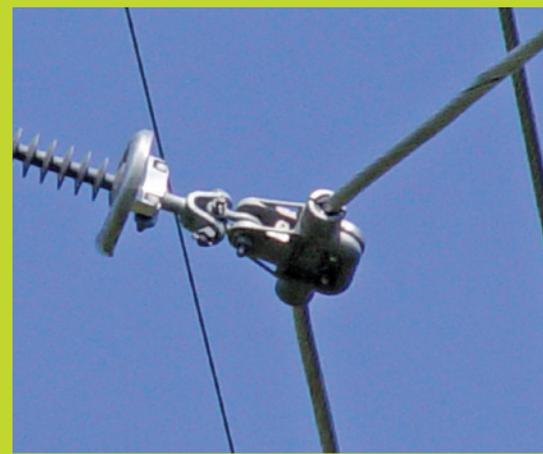
Cleaning



AFL offers a complete line of push-style cleaners, reel or cassette style cleaners, cleaning fluids, wipes, optical cards, cleaning sticks and tips plus compact, pre-stocked fiber optic cleaning kits for field cleaning.



INSIDE CENTRAL OFFICE



AFL

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