Vibration Damper Recommendations for the PowerGuide® All-Dielectric Self Supporting (ADSS) Cable

Cables installed in an aerial outside plant environment could experience vibration which may fatigue the metallic support hardware. In the most severe applications, the damage to the support hardware can ultimately cause system failure. This applications note addresses the two main types of vibration, susceptible applications, vibration reduction devices and specific recommendations.

For the ADSS cable, two significant types of vibration may occur; they are aeolian and galloping. Aeolian is a high frequency, low amplitude vibration that typically occurs intermittently depending on installation and environmental conditions. The waveform amplitude is extremely small with a high frequency, which may give the cable a 'fuzzy' visual appearance from the ground. After extended periods of aeolian vibration, the hardware may become excessively fatigued and begin to elongate or fail.

The second type of vibration is galloping. Galloping is a low frequency, high amplitude destructive process which typically occurs during ice formation under certain wind conditions or non-uniform ice shedding. The waveform will toggle between pole locations within the span and may ultimately cause the hardware to breakaway from the tower and/or damage the cable. Galloping occurs when the cable and hardware are operating near maximum rated loads (ice loads) and then the additional loads may cause the system failure.

The onset of vibration is dependent on multiple variables, which make accurate prediction impossible. Variables that effect the likelihood of vibration include the operating tension, cable weight, wind conditions (speed, direction, and duration); terrain and non-uniform ice accumulation or ice shedding. Regions or applications that may be particularly susceptible include,

- coastal regions
- high dessert regions
- canyon crossings
- waterways
- treeless terrain

The applications listed above will generally have long-term constant wind speeds caused by pressure differentials or laminar wind flow.

The spiral vibration damper is considered the most effective means of reducing damaging levels of vibration to acceptable limits, see Figure 1. The use of vibration dampers can eliminate up to 95% of the waveform amplitude for aeolian vibration.

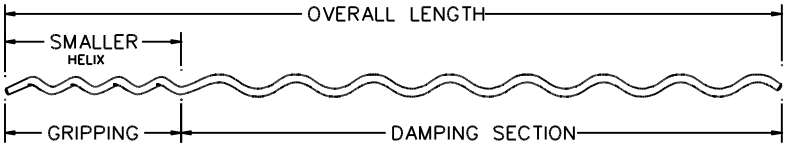

Figure 1. Typical spiral vibration damper

OFS Fitel, LLC recommends the use of spiral vibration dampers to minimize vibration on the PowerGuide® All-Dielectric Self-Supporting cable (ADSS). The number of spiral vibration dampers recommended is based upon the span lengths and assumes normal operating and installation conditions.

Span Length	Number of Spiral Vibration Dampers
0 – 800 feet (0 – 240 m)	2
801 – 1600 feet (241 – 485 m)	4
1601 – 2400 feet (486 – 730 m)	6
> 2400 feet (> 731 m)	Contact OFS Fitel, LLC

** Add 50% additional vibration dampers for river crossings, canyon/ravine crossings, abnormal applications or locations with a history of vibration.

For low voltage distribution applications, the spiral vibration damper may be installed directly off the end of support or dead end assemblies. In most short span applications where small support clamps and dead ends assemblies are being used, a construction lineman should be able to place the vibration dampers without the aide of a bucket truck.

For high voltage applications (≥ 69 kV), the vibration damper should be installed with a minimum separation between the armor rods and damper. The following table lists the minimum recommended separation.

Type of Hardware	Conductor Voltage	Minimum separation (ft)
Dead end or heliformed support	69 – 114 kV	2
Dead end or heliformed support	≥ 115 kV	4-5

The primary purpose of the separation is to reduce the potential difference along the damper length to below 2 kV. This maximum potential difference minimizes the likelihood of degradation in the event, the damper becomes contaminated or conductive.

OFS is not an original equipment manufacturer of spiral vibration dampers. Our recommendations are typically made in conjunction with SVD manufacturers. In the event of a disparity between recommendations, OFS defers to the OEM manufacturer of the damper.