Minimum Information Necessary to Design the PowerGuide™ All Dielectric Self Supporting (ADSS) Cable

Application Note AN-200

PowerGuide™ cables are engineered per a specific customer application. The following information is necessary to match cable performance to installation conditions while maximizing cable value and assuring a long cable life.

Please complete and return Table 1 to OFS for the appropriate PowerGuide design.

Table 1 - Minimum Requirements for Designing the PowerGuide ADSS Cable

Fiber type	☐ AllWave® ZWP singlemode fiber ☐ TrueWave® RS LWP ☐ 62.5/125 multimode ☐ other: _____
Maximum cabled attenuation coefficient	**Unshifted singlemode:** ☐ 0.35/0.25 dB/km @ 1310/1550 nm (standard) ☐ other: _____ **Non-zero dispersion singlemode** ☐ 0.25 dB/km @ 1550 nm (Standard) ☐ other: _____ **62.5/125 multimode:** ☐ 3.4/1.0 dB/km & 200/500 MHz*km @ 850/1300 nm (standard) ☐ other: _____
Number of fibers	
Number of fibers per buffer tube	☐ standard (6 fibers/tube for fiber counts ≤ 30 else 12 fibers/tube) ☐ other: _____
Maximum span length	_____ ☐ meters or ☐ feet
Install Temperature	_____ ☐°C or ☐°F (**assumed 68°F if not specified**)
Worse case storm loading condition (short-term) OR User specified	**United States NESC standard (if applicable)** ☐ NESC Light ☐ NESC Extreme Wind Loading (110mph) ☐ NESC Medium ☐ NESC Heavy **Custom Requirements:** Please enter requirements Radial ice load: _____ ☐ mm, ☐ inch Horizontal wind speed: _____ ☐ m/s, ☐ km/hr, ☐ MPH Temperature: _____ ☐ °C, ☐ °F
Cable sag constraints	Long-term ***installation*** sag (vertical): minimum: _____ (**Typically assumed to be 1.5% of the span**) Short-term ***loaded*** sag (vertical component): minimum: _____ ☐ meter, ☐ feet, ☐ % of span maximum: _____ ☐ meter, ☐ feet, ☐ % of span
Outer Jacket	☐ Medium density polyethylene (standard) ☐ Tracking resistant engineered polyolefin
Number of Jackets	☐ 1 ☐ 2 (Single jacket short span cable will be offered whenever possible unless double jacket design is required by the customer)
Water Blocking Mechanism	☐ DryBlock™ Gel filled tubes (standard for double jacket designs) ☐ Dry Tubes (standard for single jacket designs. N/A for double jacket cables)
Special Requirements (i.e. cable marking or additional cable design requirements)	

PowerGuide Cross Sectional Drawing

The PowerGuide cable design incorporates loose buffer tubes stranded around a dielectric central member with an aramid yarn reinforced, double polyethylene sheath for overall protection of the cable core. The polyethylene jackets are separated by aramid yarn which functions as the primary strength member. The PowerGuide cable is an all-dielectric self supporting cable ideally suited for aerial distribution and transmission networks, see Figure 1.

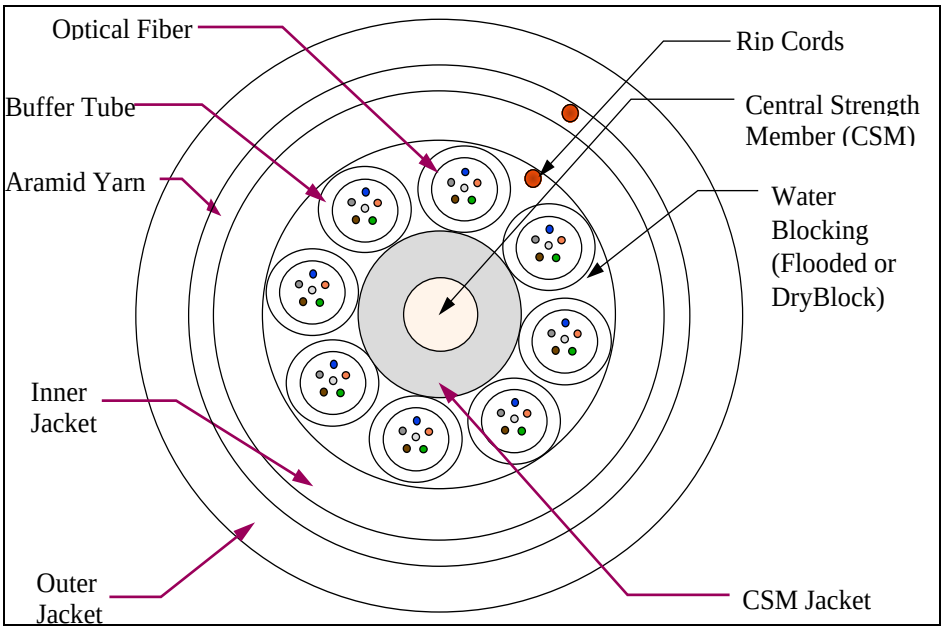

Figure 1. PowerGuide ADSS cable cross-sectional drawing

Cable Construction - PowerGuide

This specification provides the general cable construction details for a standard PowerGuide LooseTube optical cable, listed radially from the center:

1. A central member which functions as a anti-buckling element is a glass/epoxy composite dielectric rod. A polyethylene overcoat may be applied to the central member to provide the proper spacing between buffer tubes during stranding.
2. Optical fibers are enclosed within gel-filled buffer tubes that have a diameter several times larger than the diameter of the fibers. The optical fibers are loose within the buffer tubes allowing the fibers to move freely and each are color coded for ease of identification.
3. The buffer tubes (and filler rods, if necessary) are stranded in a reverse oscillation lay (ROL) technique around the central member.
4. The core is wrapped with two counter helically applied non-hygroscopic threads to bind together the cable core.

5. For the flooded construction, all interstitial voids in the cable core are flooded with a semi-solid polyolefin based compound to prevent water ingress and migration. The compound is non-toxic, dermally safe and compatible with all other cable components. For the DryBlock construction, dry binder threads impregnated with Super Absorbent Polymers (SAP) bind and cover the buffer tubes. In addition, two (2) water blocking threads are helically applied about the central strength element to block water along that path. The SAP contained in the threads shall swell upon contact with water to form a thixotropic "jelly" which effectively blocks the core.
6. An inner polyethylene jacket is applied over the cable core. Aramid yarn is applied over the inner jacket to provide the cable with the required tensile strength. The aramid yarn and/or Mylar tape prevents adhesion between the jackets yielding a non-bonded design.
7. An outer jacket is applied over the aramid yarn to provide overall mechanical protection. For ease of jacket removal, a ripcord is provided under each jacket.
8. The cable shall be printed with the following legend: "OFS OPTICAL CABLE (month and year of manufacture [MM-YY]) (telephone Symbol) (Product Description) (XXX F)"
   where XXX is the number of optical fibers in the cable. Identification marking are printed every one meter for meter markings and every two feet for foot markings.

Loading Conditions

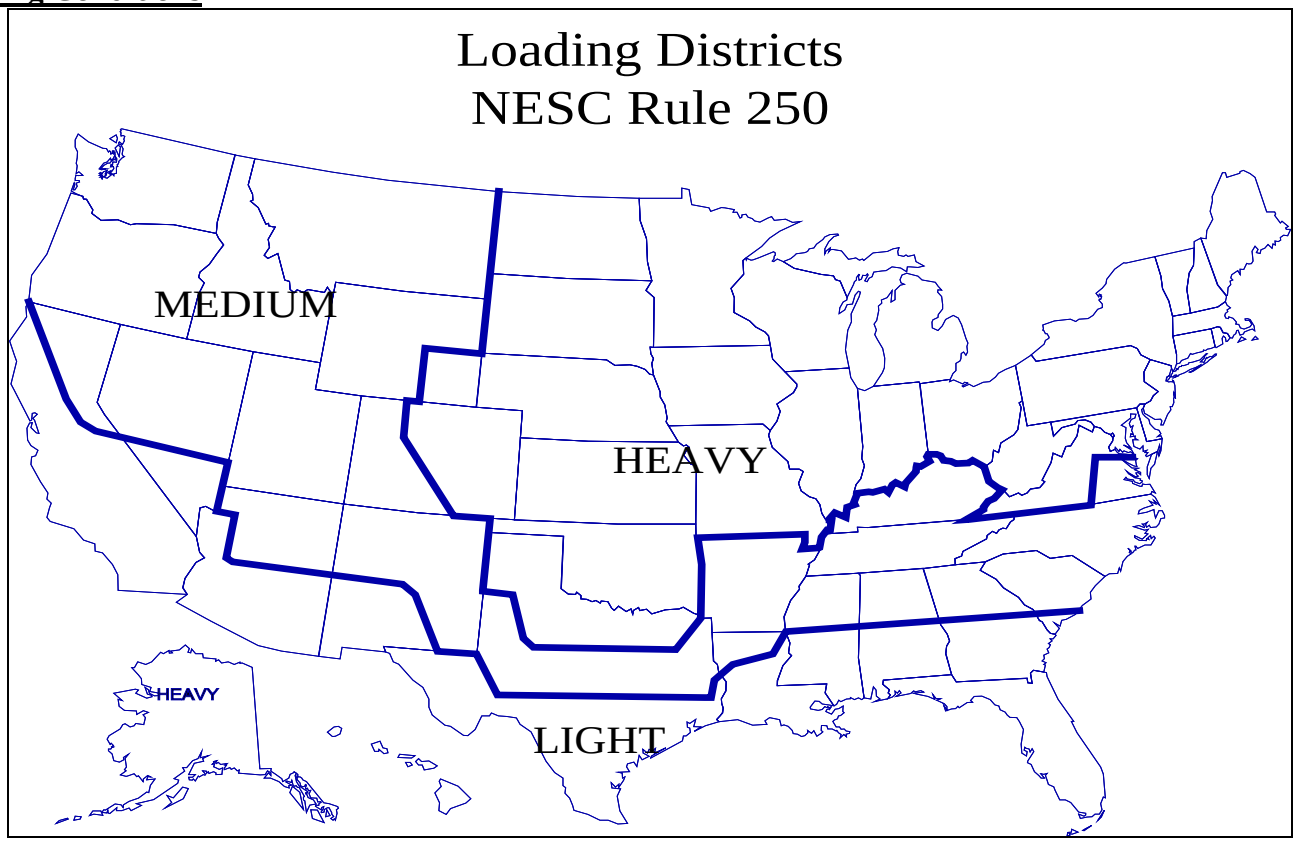

Figure 2. United States Loading Districts

The National Electrical Safety Code (NESC) divides the United States into three storm loading zones based on prevailing weather conditions. The zones are designated light, medium, and heavy. Figure 2 shows the NESC district loading map however local conditions may cause deviations from the map. Table 2 lists the general loading requirements used to define each loading district.

NESC Condition	Radial Ice		Wind Pressure		Temperature		Safety Factor	
	in	mm	lbs / ft^2	Pa	°F	°C	lb/ft	N/m
Extreme Wind	0.0	0.0	16.4 (Hawaii) 23.1 (Puerto Rico)	786 (Hawaii) 1106 (Puerto Rico)	60	15	0.0	0.0
Light	0.0	0.0	9	430	30	-1	0.05	0.7
Medium	0.25	6.4	4	190	15	-10	0.20	2.5
Heavy	0.50	12.7	4	190	0	-20	0.30	4.4

Table 2. NESC Storm Loading Conditions

The loading conditions which are applied simultaneously during the PowerGuide cable design will cause both horizontal and vertical displacement which yields a resultant cable sag.

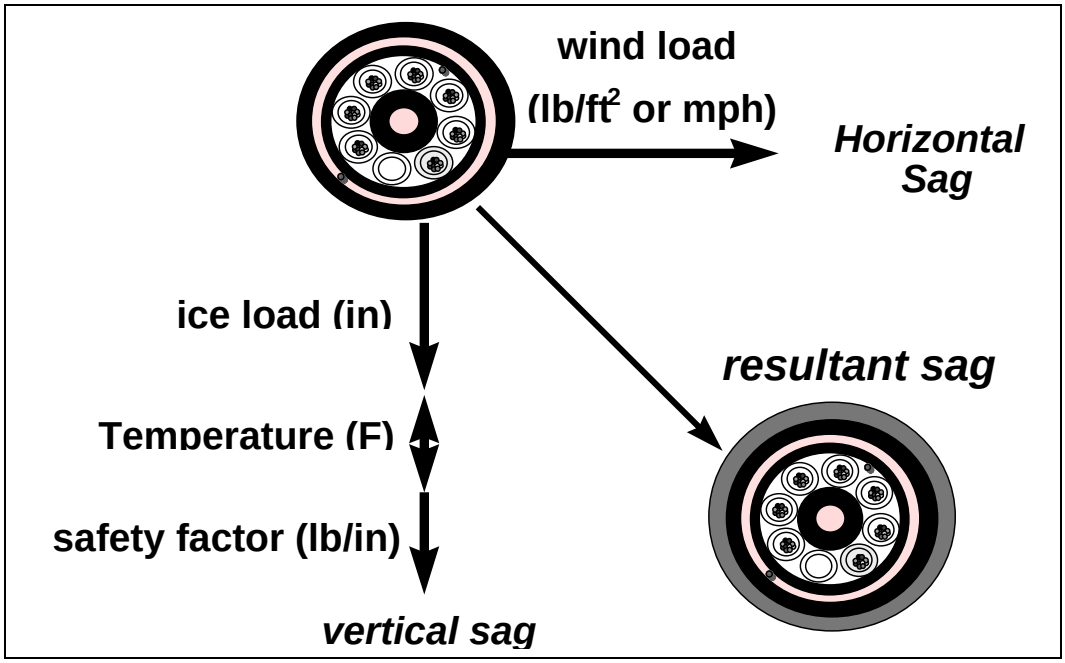

Figure 3. Environmentally Loaded PowerGuide ADSS cable

Outer Jacketing Materials

The standard polyethylene outer jacket material is suitable in applications where the electric space potential is less than or equal to 12 kV. In addition, OFS offers a tracking resistant outer jacket which is suitable in applications where the electric space potential is less than or equal 25 kV. As an optional service, OFS will perform electric field analysis to determine the expected space potential at the PowerGuide attachment point. From this information OFS can make a recommendation whether or not the tracking resistant jacket is necessary. Please complete and return Document AN-203 for high voltage applications.

Please call OFS at (877) 416-9883 for additional information, including PowerGuide performance characteristics, installation procedures, and cable hardware recommendations.

OFS reserves the right to improve, enhance, and modify the features and specifications of products without prior notification.