

*Wind Farm
Cable Systems*

Distribution Cables | Tower Cables | Fiber Optic Cables

Committed to Renewable Energy

Prysmian has always been dedicated to the business of making our environment cleaner, safer, and more enjoyable. With products such as our Afumex™ low-smoke zero halogen cables, our EPRCompact™ PILC replacement cables, our commitment to RoHS compliance, and our lead-free product line, coupled with our certification to ISO 14001 in our manufacturing facilities, this dedication permeates everything we do. It is for this reason that Prysmian is proud to support the growing wind farm and renewable energy markets. Applying our vast knowledge of utility distribution systems along with over 125 years of experience in manufacturing cables, Prysmian is your premier supplier of power and communications cables for your wind farm projects and other renewable energy needs.



The Emerging Wind Farm Market

Wind farms are like small cities. Each tower must be interconnected by means of a distribution system which can deliver power to the substation. The underground cables used in this distribution system are not unlike the Underground Residential Distribution (URD) cables which would be used in a standard utility grid. And they face all of the same challenges. Electric utility companies have spent many years re-designing their cables in order to maximize



the cable life while still maintaining the most cost effective solution. The key is to choose the appropriate insulation materials, design the shield in accordance with system requirements, and choose extruded thicknesses which suit the application. In most cases, standard “catalog” cables simply will not do. As the largest power cable manufacturer in the world and one of the largest utility power cable suppliers in North America, Prysmian has vast experience in designing and manufacturing both EPR and TRXLP distribution cables with all of these ideas in mind. Through our worldwide Research & Development facilities, we have spent the last 50 years developing customized product solutions which address the

issues that utilities have faced with regard to extending product life and choosing the right cable for the right application. And now, we are able to bring that extensive expertise into this new and exciting wind farm market. In addition to reliable, long-life distribution cables, Prysmian can also supply a full range of medium voltage splices and terminations for all of your power distribution needs. We also supply several different flexible cable options for use within the towers themselves. And for all of your communications needs among and between towers and substations, Prysmian manufactures a full range of single and multimode fiber-optic cables for those applications as well.

Doubleseal Distribution Cables

Water is Public Enemy #1 to underground power cables. Back in the late 1960's, utilities were installing standard unjacketed polyethylene insulated concentric neutral power cables in underground applications. Many times, these cables were direct-buried and, almost always, they experienced failures in a relatively short period of time. The industry determined that the combination of moisture and voltage stress was leading to the formation of water trees within the polyethylene insulation which, in turn, was causing the insulation to fail prematurely. So Prysmian's mission was to keep water out of the cable core.

We started with the conductor strands and developed our premium Strandseal® filling compound. Prysmian was the first manufacturer to develop a strand filling compound and ours is still the best in the industry - blocking up to 15 psi of water pressure for over 1 hour. We continued the process with a proprietary water swellable powder which we applied over the concentric neutral strands and under the encapsulating jacket of a standard URD power cable. We call this water-blocking combination our Doubleseal™ cable and it is, to this day, the only commercially available power cable that can block up to 15 psi of water pressure for over 1 hour across the entire cable cross-section (including the jacket interface). And we did it all without altering the basic design of a standard URD power cable. For wind farm distribution applications where you require a standard concentric neutral design with a premium life expectancy, Doubleseal™ is your first and only choice.



Tripleseal Distribution Cables

For those customers who are looking for the ultimate in reliability and protection, Prysmian offers our exclusive Tripleseal™ cable. This is a premium alternative to the standard concentric neutral URD cable and utilizes a corrugated copper LCShield® which is longitudinally applied over the cable core. This shield gives many benefits over individual neutral wires including continuous core coverage, superior protection from lightning, decreased shield losses, and increased ampacity ratings on the overall cable. And because the LCShield® has a high surface area to volume ratio, the heat is dissipated more effectively which allows for very high fault current ratings using less copper than a standard neutral wire shield.



But perhaps the best feature of the Tripleseal™ design is the fact that the cable core is completely sealed from the ingress of moisture. We accomplish this task by applying Strandseal® between the conductor strands, a water swellable tape beneath the LCShield®, a hot-melt seal at the LCShield® overlap which is flexible enough to accommodate expansion and contraction of the cable core during cyclic loading, a water swellable tape on top of the overlap, and water swellable powder underneath the jacket. The result is a cable that will remain moisture-free throughout its life and is expected to last up to 20% longer than standard URD designs.

Elaspeed Cable Accessories

Completing the distribution system are the cable accessories. Prysmian can provide a range of cold-shrink splices and terminations to meet the rigorous demands of wind farm applications. Our Elaspeed™ line of accessories includes a single conductor self-ejecting splice that can be installed on prepared cable ends in under 10 minutes. This is a self-contained splice body with all of the parts and pieces required to make a fully shielded, jacketed, and water-blocked splice within one complete kit. We also provide a cold-shrink medium voltage termination which features the same quick and easy installation in one complete package.



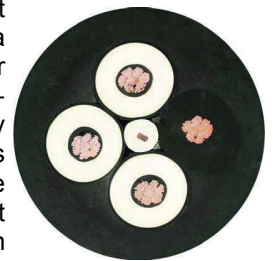
Premium Tower Cables

Inside the tower, power cables are required from top to bottom. But these are no ordinary power cables. Because the turbines are constantly twisting and turning toward the direction of the wind, the cables that span the length of the tower must be designed to accommodate high torsional stresses. For those applications where the transformer is located at the

base of the tower, a fairly generic flexible low voltage DLO cable is often used. This is an EPR insulated cable with a highly flexible strand and either a CSPE or CPE jacket. This cable was originally intended for use in diesel locomotive applications but is now used in many applications where flexible cables are required. Prysmian can supply this design in a full range of sizes.



For those customers who desire a premium low voltage cable for use in towers, Prysmian offers our TecWind line of cables. Building off of our vast worldwide experience in providing crane cables, Prysmian has designed a high strength, torsion-resistant construction which uses highly flexible conductor strands, a specially formulated EPR insulation material, and an overall oil-resistant halogen-free sheath that provides the ultimate in both mechanical protection and personnel safety. For medium voltage applications where the transformer is located at the top of the tower, Prysmian offers a TecWind cable which features our exclusive medium voltage EPRotenax™ insulation system, specially formulated semi-conductive shields for electrical field control without the need for a metallic shield which might otherwise tear or be damaged, and an overall extra-tough chlorinated polyethylene or chloroprene rubber sheath. All TecWind products have been specially designed to accommodate the unique range of stresses that might be found inside a wind tower - which means that they can be installed free-movable, free-hanging, or fixed. These cables can also be provided in pre-terminated factory-fitted lengths for faster and easier installation within the towers.



Fiber-Optic Cables

For all of your wind farm communications needs either in the tower or between the substation, Prysmian manufactures a full line of single and multimode loose tube fiber-optic cables. These cables can be supplied with or without an armor for use in direct-buried or duct applications. Prysmian's communication cables feature flexible buffer tubes with dry water-blocking technology to facilitate quick splicing and terminating while providing the most reliable, longest life fiber-optic cable available. Prysmian also manufactures a wide array of ribbon cables, premise cables, ADSS cables, and OPGW cables to satisfy virtually all of your communications needs. This truly makes Prysmian your one-stop supplier for all of your wind farm connection requirements.



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