

WINDLINK®
ENERGY TRANSITION
SIMPLE AND SAFE





WHEN GROWTH IS IN THE WIND, **WINDLINK®** GIVES YOU RELIABILITY, CONFIDENCE AND SECURITY

Countries globally are struggling with the twin challenge of ensuring secure energy supplies and meeting climate targets. Wind energy will play a major role in the race to reach the Paris Agreement goal of 1.5°C global warming. Offshore wind represents a key opportunity for countries to push the energy transition forwards at scale.

After a year in which net zero commitments gathered global momentum, the market outlook for the global wind industry looks even more positive. We can expect an average annual growth rate of about 6.6%, even though the level of installed capacity for 2021 was the second highest in history.

In this very special environment where time-to-market is key, and cycles are accelerated, market leaders expect co-engineering, sound technical advice, pre-testing and easy-to-install solutions, from business partners ready to take more value chain responsibility. The overall goal is to reduce supply chain complexity, through vertical integration, modularization, and higher standardization, so maintaining strong quality standards and local presence.

What you expect from a cable producer:

- A complete range of quality wind turbine cables and accessories
- Light, flexible cables that can handle torque, temperatures, oil, heat, vibrations
- Technical innovation that keeps pace with the wind industry
- Customized products and services, including supply chain
- Integrated cable solutions: pre-cuts, kits, interconnectivity, accessories
- Easy assembly and installation, low failure rate, and exceptional durability
- Worldwide presence and expertise ensuring steady supply for your international projects
- Implementation assistance, cost-reduction, joint production planning
- Design engineering for critical areas, testing (temperature, stress, flexibility)

Nexans WINDLINK offer proposes a full range of reliable, high-performance cable solutions for wind turbines. Windlink contributes to improve wind turbine output and performance and provides solutions for blades, nacelle, tower and transition piece sections. Rather than just providing cables and components, Nexans' widely-recognized WINDLINK® solutions can outfit a complete wind turbine, assuring that all elements are fully interoperable and compatible to ensure compatibility and durability as an entire system.

We produce every cable in the nacelle, tower and base: from connection cables for generators, loop cables and fixed installation cables... to sensor, control, Fieldbus, Profibus, and optical fiber cables, including all connectors, accessories and medium-voltage jumpers, harnesses and kits. Moreover, we manufacture active equipment, like intelligent Ethernet switches that can consolidate diverse applications: monitoring, IP telephone, IP camera surveillance, diagnostics, tower access and climate control...all on one fiber via Virtual Local Area Networks (VLANs).

Nexans has a proven reputation for cable reliability and technical expertise, and substantial production capacity worldwide to assure OEMs of product availability, especially in emerging markets. High-quality cables and components keep wind parks operating, avoiding power losses and costly shutdowns. That's why we offer reliability, confidence and security based on our wide experience in parallel fields, like automation, material handling, and offshore installations.

WINDLINK®, a wide range of reliable cable solutions for quality and performance

- World supplier of all cables for wind turbines
- Innovative and customized wind power solutions
- Pre-engineering and special kits for easy end-assembly
- On-Time-In-Full (OTIF) delivery through advanced logistics
- Fire performance and protection through halogen-free insulation and sheath
- Technical and R&D support for total life management
- International certification including UL/CSA, standardization and interconnectivity
- Nexans provides fully electrically tested solutions ensuring compatibility and durability of the system and lowering failure rates during installation and commissioning on site. Those plug and play solutions easy to install decrease considerably installation time on field.



WINDLINK®

A FULL RANGE OF CABLE SOLUTIONS TO IMPROVE WIND TURBINE OUTPUT AND PERFORMANCE

SOLUTIONS FOR TOWERS

Low-voltage loop rubber cables



These cables (up to 1kV) reliably transmit energy produced in the generator to the transformer, usually located at the base of the tower. They come in Low-

Smoke Zero-Halogen (LSZH) versions, and are also oil-, abrasion-, UV- and ozone-resistant. Whenever we supply this cable we do lifetime tests according to movement and torsion requirements.

Medium-voltage loop rubber cables



Similar to LV loop cables, they can handle up to 66 kV between the nacelle-based transformer and the switchgear at the base. We are supplying MV loop

cables to wind OEMs for all types of turbines.

Low-voltage fixed installation cables



Copper can be single or multicore, with EMC screening. Aluminum singlecore are larger; they weigh half as much, making them cheaper, and easier

to handle and install in high towers. Nexans supplies LV aluminium cables to wind OEMs.

SOLUTIONS FOR NACELLES

Low-voltage 120°C flexible cables with EMC



For linking generators to transformers positioned high up in the nacelle, Nexans produces LV silicone cables that can endure intense heat (120°C). Available in LSZH version. Nexans has outfitted Alstom's Eco 100, its most powerful wind turbine.

Medium-voltage flexible cables



Available in light, flexible and compact rubber versions for large turbines, these single and 3-cores cables can withstand three full twists in either direction. These cables can use standard connectors, and therefore save time and money.

Medium-voltage 180°C singlecore cables



Siwo-Kul™ flexible silicone-insulated singlecore connection cables carry high current in hot conditions, up to 180°C. They are used as output connections from the winding bars of Class H generators, and for current converter cabinets. These durable, environmentally-safe cables are supplied to all major wind OEMs.

Nexans' global wind power presence includes cable harness production facilities in China, Denmark and Poland

Nexans strengthens its global wind network and increases its production capacities to meet the growing demand for clean energy and electricity in the world. Nine months after the company opened a similar facility in Poland, Nexans extends its presence in China and unveils a new cable harness production facility in the city of Tianjin.

The three facilities in China, Denmark and Poland are part of Nexans' extensive offering in the Industry market, supporting a wide range of wind turbine and industrial oem's and with customized cabling and connectivity solutions.



SOLUTIONS FOR TOWERS AND NACELLES

Control cables



Flexible shielded cables (2 to 100 cores) are used to carry energy (300 volts to 1kV) and low frequency signals to control the motor drive or the generator for breaking, positioning or optimizing rotor RPMs. Special sheathing is available for ultra-low temperatures, while smaller LIHCH cables are halogen-free. Our torsion- and oil-resistant cables are designed to last for 20 years and more.

Electronic and data transmission cables



Thermoplastic Modified (TPM) 2 to 5-core sensor multicore and multipair cables measure wind speed, temperatures, and performance parameters,

while 2-core Fieldbus cables are used in parallel with energy cables to digitally control all electronic and mechanical devices. 2-core Profibus cables deliver up to 12 Mbit/s for complex control services; and data transmission cables offer Industrial Ethernet speed. Increasingly, all cables are shielded for EMC protection.

Nexans has supplied electronic and data transmission cables to Hyundai Heavy Industries and Sinovel.

Fiber-optic cables



To assure high data transmission capacity for monitoring and control, Nexans' rugged, halogen-free FO cables offer Electromagnetic

Compatibility (EMC) in energy-dense areas. They are very flexible and can handle high torsion. Large cores (200 microns) make connectivity easier.

Vestas confirms the trust in Nexans products and solutions

Nexans provides to Vestas Wind Systems WINDLINK® cable kits for turbines destined for onshore wind farms in Europe, the US, China and Brazil. **We are providing MV cables for loop applications and kits, LV copper cables, MV rubber cables, and both LV and MV kits.**

Nexans provides pre-connected, pre-tested and easy-to-fit connections for power, control and communication functions within the nacelle, tower and control panels.



ACCESSORIES, KITS AND TESTING

Fiber-optic accessories



Nexans produces a full range of indoor/outdoor waterproof and pressurized closures to protect, store and splice fibers. A range of cassettes and splicing frames

optimize individual fiber management. These housings are easy to install and service, and require virtually no maintenance.

Low-voltage connectors



Able to withstand thermal cycling and tower vibration throughout a turbine's lifetime, our systems use a shear-bolt connector with a rubber sleeve, or a heat

shrink. A new bi-metallic connector (copper to aluminum) with a protective roll-on tube is fast and easy to install without special tools. These connectors offer protection, insulation, short-circuit stability and long-term reliability up to 3kV

T-shaped connectors up to 72,5kV



The optimised design of Nexans outer-cone T-shaped connectors fits the purpose of compactness for the new generation of switchgears and transformers. Due to

their wide range of Cable Adaptor, Nexans T-connectors can also accommodate all the cross-sections of large turbines and cable-to-cable connections available to the market. The EPDM semi-conductive outer layer of Nexans T-connectors body makes them safe-to-touch and the most reliable over the years

Low-voltage kits



To facilitate assembly, Nexans provides pre-connectorized kits which bundle energy, control and data cables for wind turbine electronics. Also, cut-to-

length, pre-connectorized, all-power cables are supplied to tower manufacturers for generator-to-switchgear-to-main-powerline links.

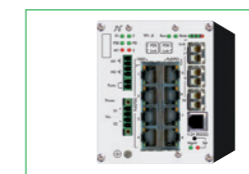
Pre-assembled jumpers up to 72,5 kV



For more than 10 years, Nexans has been extending its expertise on cable and power accessories to provide customized pre-assembled jumpers cable. From 1m length

this could accommodate any turbine or dropper cable length needed. Equipped on both sides with accessories to connect generators, transformers and switchgears. All jumpers are tested (voltage test and PD test) in the factory to assure immediate and fault-free installation.

Active switch systems for communication and monitoring



These small and rugged switch systems contain up to 3 fiber optic uplink ports and 8 copper ports for multiple applications via just one fiber. They are able to supply

connected devices (IP cameras and phones, WLAN access points) with PoE, and come with a diagnostic monitoring function. A memory card allows non-IT maintenance personnel to replace and reconfigure the switches.

Auxiliary equipment and systems



Mechanical support (hang-off and clamping systems, protective shells/slabs/mattresses).

- Easy-to-install hang-offs to fasten energy cables above sea level, available sealed or non-sealed.

Additional offer up to 72,5 designed to reduce the installation time



- A range of offshore junction cabinets (OJC) or frames (OJF) for use in the transition piece of turbine towers and in substations. Pre-terminated leads offer important cost savings.
- For offshore, an OJC can be used as a connection point between tower cables and subsea array cables.
- Cabinets and frames can also be used in offshore substation solutions.
- Our terminations and joints make installation quick, easy and long lasting. Specific training courses in power accessories installation are available.

SERVICES ON THE HORIZON

GLOBAL EXPERTISE

Nexans has broad experience in land-based and offshore wind turbines of all types and sizes. Mastering both LV and MV energy cables and all necessary control cables, we are proven integrators who can supply complete systems, as well as customize cables and accessories.

LOCAL PRESENCE

Because the wind power industry is increasingly global, Nexans has organized its production and delivery logistics to support turbine producers anywhere in the world, and that includes obtaining pre-qualification in many countries, providing commercial off-

the-shelf products. Nexans expands its presence with harness manufacturing sites to mount low voltage , control, data and FO kits, in Poland and China.

TECHNICAL LEADERSHIP

Nexans is creating the knowledge and technology needed to sustain an expanding industry which is constantly moving to larger megawatt turbines. Our innovative products are easy-to-install and have proven their ability to survive for long periods in extremely tough environments. Nexans designs operate reliably in the harshest sea-going conditions, while offering unsurpassed security and fire-safety.

Nexans

www.nexans.com

industryprojects.business@nexans.com