

# Signal and energy transmission cables for wind turbines



**BRUGG**  
eConnect

# Test facility for torsionable cables and lines in wind turbines

The 16-meter test facility is used to test energy and data connecting lines in a life cycle test of up to 15,000 torsion cycles. The cables, which feature maximum dynamic strength and flexibility at low temperatures, are developed, manufactured and tested on the basis of the customer-specific requirements of the wind turbine manufacturer.

Test facility details	Values
Max. test height	up to 12 meters
Max. test capacity	32 cables in the practical test (with or without spacers, as desired)
Speed of rotation	Test speed in the range of 0–20°/sec. (variable)
Torsion angle	Angle range +/- 1080° (variable)
Loop simulation	Real – as specified by the wind turbine manufacturer
Conductor connections	Ring cable lug, cable grips or according to customer requirements
Tests	<ul style="list-style-type: none"><li>- Video surveillance test</li><li>- Voltage tests (low/medium voltage) in the voltage lab</li><li>- Fiber optic conductor tests</li><li>- Visual detail analysis on complete test lengths</li></ul>
Customer-specific test options	Tests are set up and carried out according to customer specifications

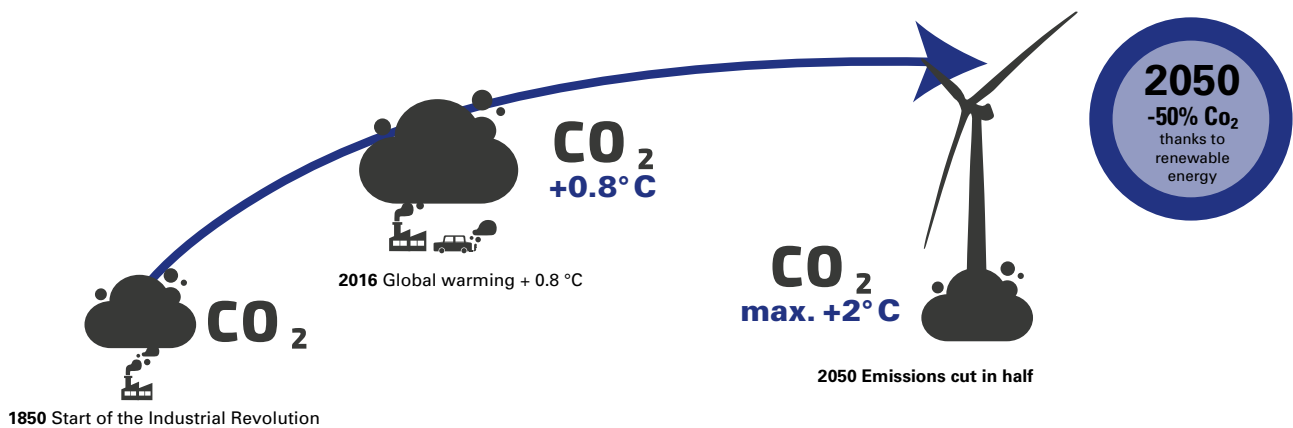


## The wind is blowing in the right direction

The move from fossil-based power generation to renewable energy is underway. The new agreement reached at the UN COP21 climate conference on limiting global warming to 2°C and cutting CO<sub>2</sub> emissions in half by 2050 is speeding up this process and giving the renewable energy market fresh momentum. According to trend calculations, the wind energy sector is growing approximately 5 percent each year and will continue to grow by the same amount. This growth is greater or more sluggish in different countries, depending on the amount of government support. It is reflected in an annual increase of 50 gigawatts worldwide, 25 percent of which is in Europe. This growth is equal to 7,000 to 8,000 new wind turbines in Europe. Offshore installations account for an increasing share of 13 percent (2010 – 2015 figures).

To accommodate this rapid expansion, wind turbine manufacturers need expert, reliable component suppliers who can grow along with the market. As a renowned and well-established cable manufacturer, BRUGG eConnect offers complete cable solutions as well as related services. We are your ideal partner, from development and testing to delivery at the construction site. We deliver outstanding quality with an optimum price/performance ratio.

## More renewable energy lowers CO<sub>2</sub> emissions



### BRUGG eConnect : specializing in high-end cables

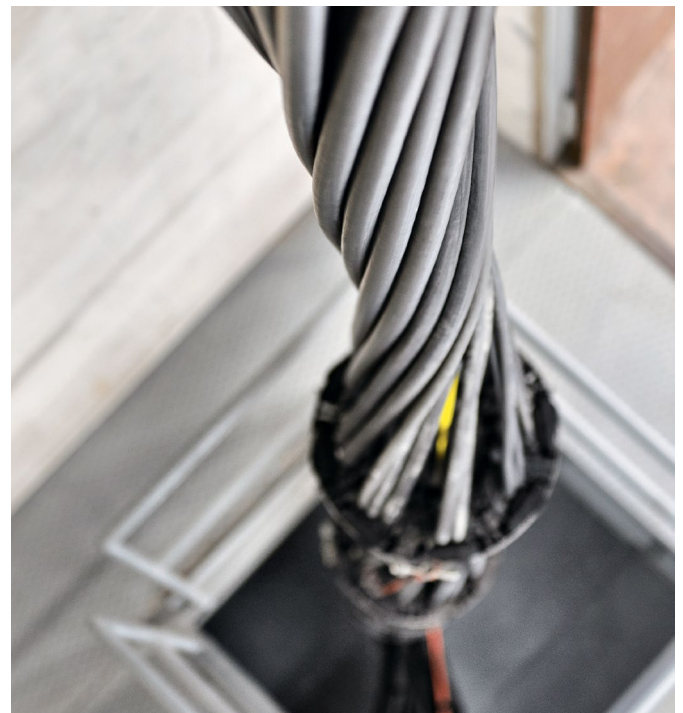
BRUGG eConnect specializes in high-end cables and has extensive expertise in the engineered-to-order (ETO) segment. The individual parts are designed and manufactured on the basis of developments according to defined customer requirements. BRUGG eConnect applies its entire specialized knowledge and experience to this work, and supports projects in all phases, from development, design, purchasing, production, testing and logistics based on customer-specific requirements to on-site installation.

Development   Design   Production

**Engineer to Order**

Assembly   Approval   Logistics

**Products & Solutions**



## Rotor blades: Lightning conductors, energy and data cables

For protecting the rotor blade against lightning strikes. Lightning arrestors and sensor cables for detecting ice.

	Lightning arrestor	Sensor cable (li
Conductor	Cu/Alu, Kl.2	Cu, Kl.5
Insulation	EPR	EPR
Shield/protection	—	PET film
Jacket	—	TPU
Temp. range	-40 °C ... + 90 °C	-40 °C ... + 90 °C

## Nacelle: Power and control cables, flexible, fixed installation

For wiring within the nacelle, switchgear cabinets and tower controller

	Single conductor, ground wire	Multi-wire, PU
Conductor	Cu, Kl.5	Cu, Kl.5
Insulation	EPR	EPR
Shield/protection	—	—
Jacket	—	PUR
Temp. range	- 40 °C ... + 90 °C	- 40 °C ... + 90 °C

## Torsionable tower (loop): power cable, torsionable, flexible

Developed specifically for deployment between the nacelle and tower in wind turbines with matched EPR/PUR single conductors.

WILBAwind	Low voltage 0.6/1 kV	
	Cu, single conductor	Cu, multi conductors
Conductor	Kl.5, torsionable	Kl.5, torsionable
Insulation	EPR	EPR
Sheath	—	—
Jacket	XLPO	XLPO
Temp. range	- 40 °C ... + 125 °C	- 40 °C ... + 125 °C

## Fixed tower: Grid connection, control and power cables

Developed specifically for fixed installation in wind turbine towers with matched FRNC cable

WILBAwind	Low voltage 0.6/1 kV		Medium voltage
Conductor	Cu, Kl.2	Alu, Kl.2 (annealed)	Cu, Kl.2
Insulation	EPR	EPR	EPR
Sheath	—	—	Cu braiding
Jacket	XLPO	XLPO	XLPO
Temp. range	- 40 °C ... + 125 °C	- 40 °C ... + 125 °C	- 40 °C ... + 125 °C

## Base, grid connection, control

Medium-voltage cable for installation in the tower base and ground

Medium-voltage cable according to HD 620:

- XKDT and XD-ALT 12/20 kV, Al, Kl.2.
- 1- and 3-conductor

Tower cabling:

- PURWIL EPR/PUR and PURWIL EMV EPR/PUR (for tower cabling and connections in the base area)

Control cables:

- BRUsteel and BRUclean, extremely robust fiber optic cable for self-supporting applications and deployment indoors and outdoors

Standards:

- IEC 60332-1 Flame retardant
- IEC 60332-3 Fire retardant (partial)
- IEC 60754-1 Halogen-free
- IEC 60754-2 No corrosive gases
- IEC 61034 Low smoke emissions
- EN 50396 Ozone resistance
- IEC 68811-2-1 Resistance to oil
- ISO 4982-2 UV resistance

Accessories: Press-fit and screw cable lugs, Al/Cu

Lightning-proof)

**PURWIL Multi-wire, shielded, PURWIL EMV**

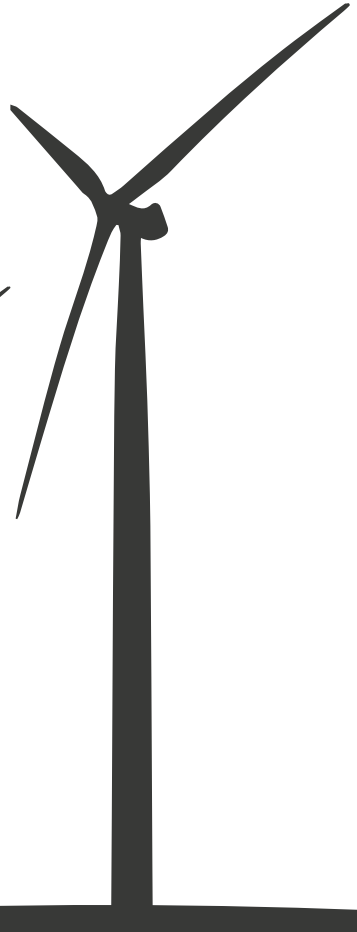
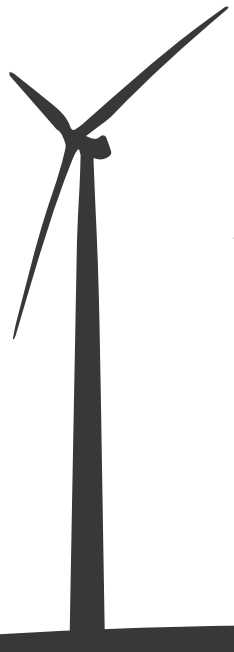
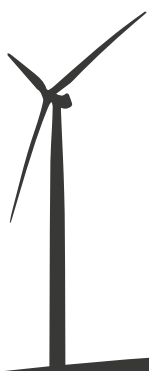
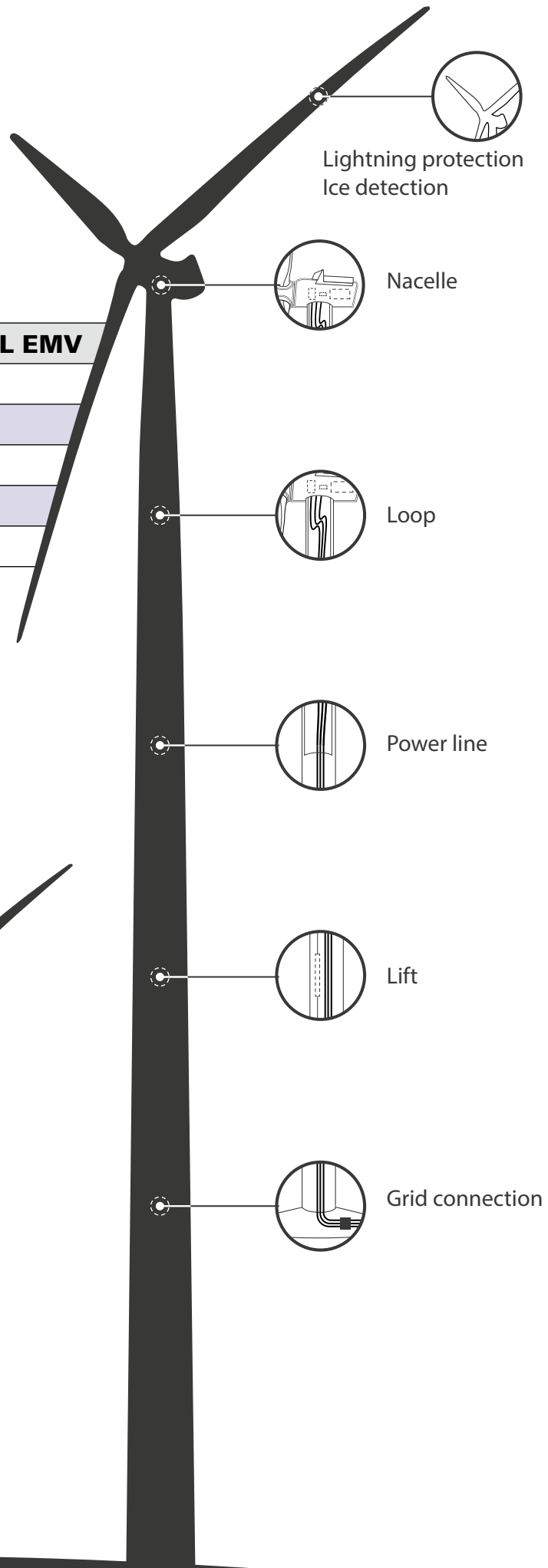
	Cu, Kl.5
	EPR
	Cu braiding
	PUR
	- 40 °C ... + 90 °C

**Medium voltage 3.6/6 kV**

	Cu
	Kl.5, torsionable
	EPR
	Cu sheath
	XLPO
	- 40 °C ... + 125 °C

**Low voltage 3.6/6 kV**

	Alu, Kl.2 (annealed)
	EPR
	Cu braiding
	XLPO
	- 40 °C ... + 125 °C



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