

WindFlex® cables are torsion twist resistant and remain flexible at temperatures from -40°C to +90°C.

#### WindFlex® Cable Portfolio

Draka WindFlex® is an extensive low and medium voltage cable program applicable for flexible installation in wind turbines. Besides the standard version, available as options are halogen free, EMC-screened and extra flame retardant versions.

#### Design Strengths

The WindFlex® design is based on existing and well proven Draka WindFlex® technology, which offers an effective combination of both rubber insulation and sheathing. WindFlex® cables are robust due to the special high quality thermosetting insulating and sheathing compounds used in their manufacture. They have a -40°C to +90°C temperature range as standard, however a special +120°C version is also available.

#### Torsion Capability

Draka WindFlex® cables are tested for torsion during the toughest possible conditions. The test is carried out at -40°C and the cables are twisted 4 x 360° each way over 10 meters for a minimum of 5000 complete cycles, to simulate 20 years lifetime.

#### Oil & Chemical Resistance

Draka WindFlex® offers excellent resistance against mineral and synthetic gear oils, cooling fluids as well as hydraulic oils. We are committed to upholding this standard by constantly testing our cable range against new industry oils. By doing this we are confident that the cables we offer have passed the most extensive fluid resistance test program in the industry.

#### Standards & Approvals

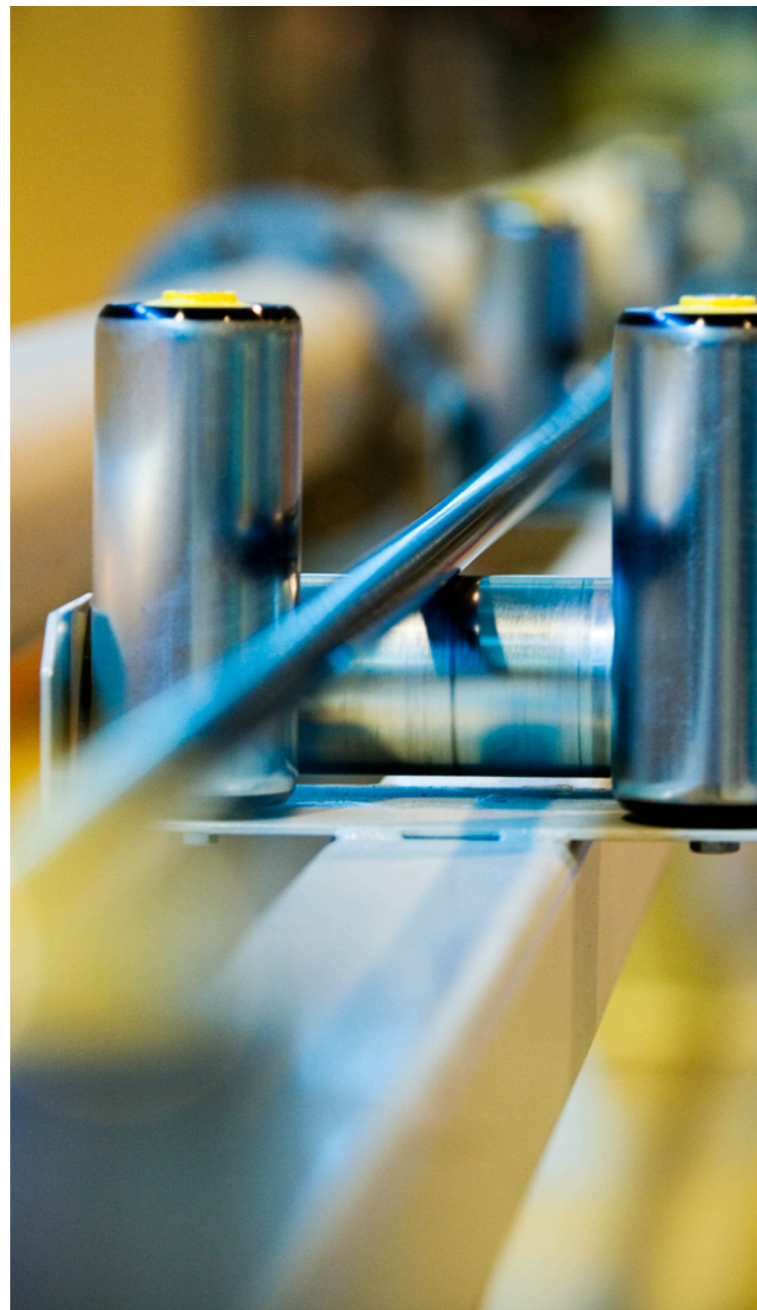
The basis of Draka WindFlex® is standard HD 22, which specifies the construction, dimensions and test requirements. Various options for approvals are available, such as UL Recognition (UL 758) and UL Listing (UL 1277 & UL 44). Additional enhanced flame resistance according to IEC 60332-3-24 category C, is also available.

#### Conductor Materials

Draka WindFlex® is designed for maximum flexibility and the conductors are always made of class 5 annealed copper.

#### An Economic Alternative

The Draka WindFlex® program is the complete solution for wind turbine application. With a wide range of designs and approvals, Draka ensures that there is a tailor made solution for all wind applications. With our wide Draka WindFlex® Global range of cables, we even ensure that one cable can be used throughout the world. The end result is simpler designs, simpler logistics and reduced costs.



Prysmian Group / Renewable Energy

## Global Wind Energy Sales Contacts

#### Brøndby, Denmark

Phone: +45 23 35 05 06  
E-mail: bertil.andersson@draka.com

#### Pamplona, Spain

Phone: +34 685 484 426  
E-mail: victor.romera@draka.com

#### Wuppertal, Germany

Phone: +49 171 673 8289  
E-mail: thomas.brandt@draka.com

#### North Dighton, MA, USA

Phone: +1 219 766 2960  
E-mail: dennis.anweiler@draka.com

#### Australia & New Zealand

Phone: +61 406 996 234  
E-mail: mark.dabbs@draka.com

#### Suzhou, P.R. of China

Phone: +86 137 0613 6113  
E-mail: henry.feng@draka.com

#### Beijing, P.R. of China

Phone: +86 139 1033 9878  
E-mail: kevin.liu@draka.com

#### Beijing, P.R. of China

Phone: +86 159 1061 8581  
E-mail: bomo.li@draka.com.cn

#### Sorocaba, Brazil

Phone: +55 15 9182 8555  
E-mail: fernanda.gaibina@drakacableteq.com.br

#### Bangalore, India

Phone: +91 932 457 5733  
E-mail: dhananjay.karve@ravincables.com

#### Bangalore, India

Phone: +91 998 691 8697  
E-mail: naresh@alltronixin.com

#### Wind Energy Globally

Phone: +45 40 19 26 31  
E-mail: dan.larsen@draka.com

[www.drakawind.com](http://www.drakawind.com)



Draka WindFlex®

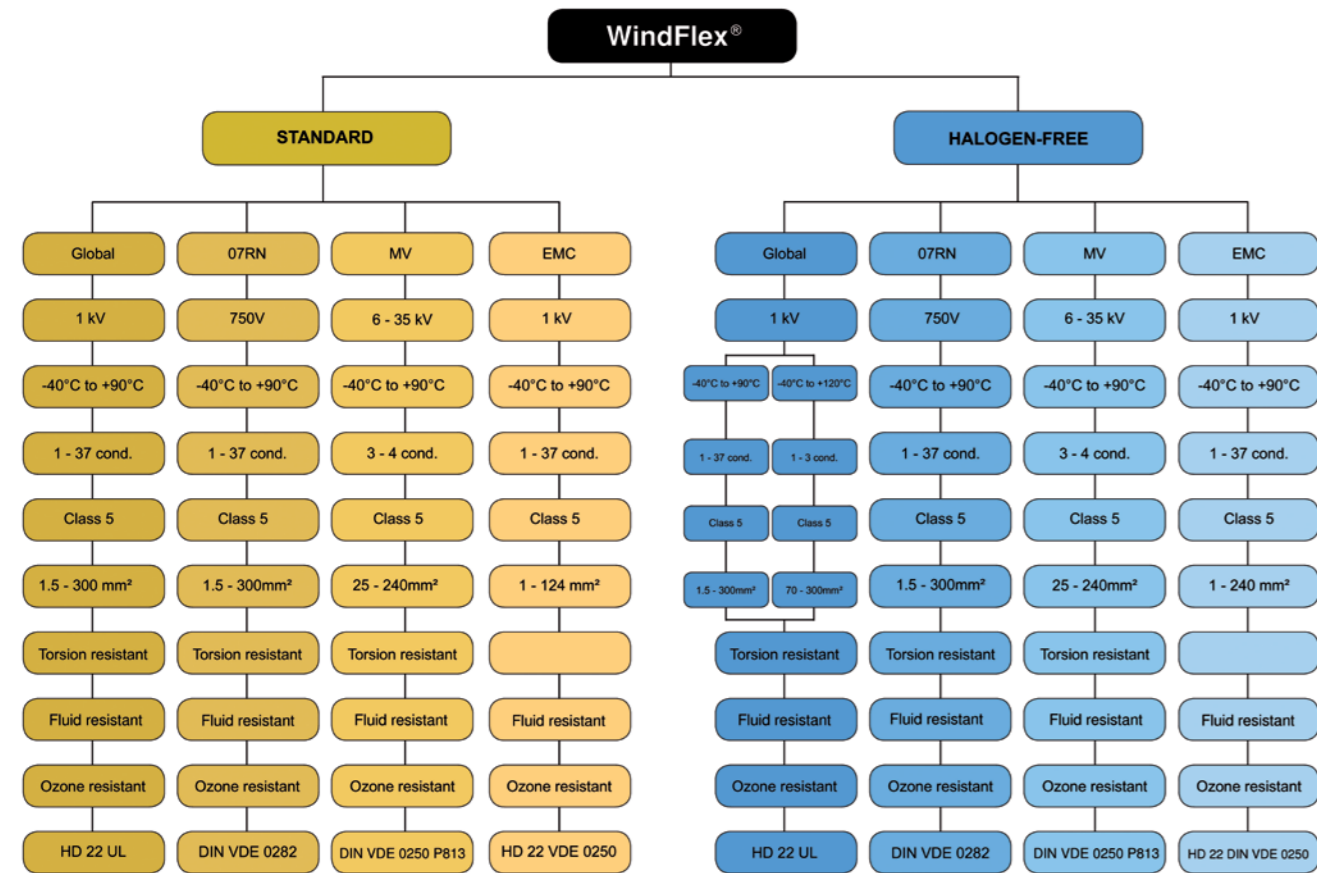
The cable solution for flexible installation in towers



A brand of the  
**Prysmian**  
Group

Draka is a brand of the Prysmian Group situated in Milano, Italy which is the mother company for a large number of operating companies worldwide - involved with developing, manufacturing and supplying cables and cable systems. Worldwide Prysmian Group consists of 98 operating companies in 50 different countries with approx. 22,000 employees.

WindFlex® family is comprised of 2 basic cable constructions with each 4 subordinate cable types.



#### UL Standards and Testing

It's important to understand the difference between a Recognized cable UL 758 and a Listed TC cable UL 1277 or UL 44

At Draka we listen to our customer's needs. For that reason we produce WindFlex® in different versions, depending on the wind turbine manufacturer's requirements for a UL Recognized vs Listed approval.

Draka provides the solution for wind turbine manufacturers to choose between UL Recognized or UL Listed. Just ask us, if you're in doubt!

Main points to consider when choosing which UL approval to use:

- Recognized cables can only be installed in machines. Fixed and flexible mounting allowed. Listed TC cables are allowed for horizontal as well as vertical installation in buildings.

- Flammability requirements are much less severe for a recognized cable. Whereas, Listed TC cables are required to resist large scale flame tests.
- Recognized cables can be lighter, due to different design requirements, that allow the use of thinner insulation and jackets. As Listed TC cables are meant to be more "tough", thickness requirements are higher - so that the construction can withstand more severe flame tests.

## We know flexible cables

### WindFlex® Global 0.6/1kV

#### Application

Flexible rubber cable for use in wind turbines at medium mechanical stress and in torsion applications.

#### Construction

- Approval according to cUL Style 4537, AWM UL 758 similar to DIN VDE 0250.
- Conductor insulation made of plain copper fine wire class 5 acc. IEC 60228.
- Insulation made of rubber compound type Class 28 UL, Type 3G13 acc. to DIN VDE 0207 part 20.
- Inner sheath made of rubber compound type GM1b acc. to DIN VDE 0207 part 21.
- Outer sheath made of rubber compound type 5GM3 cUL Style 4537.
- Bending radius when moved minimum 6 x D and for fixed minimum 4 x D.
- Minimum surface temperature fixed and moved from -40°C to maximum conductor temperature +90°C.



### WindFlex® EMC 0.6/1kV LSOH

#### Application

Flexible halogen free rubber cable for use in wind turbines at medium mechanical stress without torsion.

#### Construction

- Conductor made of plain copper, fine wire class 5 acc. to IEC 60228.
- Insulation made of rubber compound type 3G13 acc. to DIN VDE 0207 part 20.
- Inner sheath made of rubber compound type GM1b acc. to DIN VDE 0207 part 21, separator of PETP - film.
- Screen made of braid of tinned copper wires covering 85%.
- Outer sheath made of rubber compound type HXM1 acc. to DIN VDE 0266.
- Bending radius when moved minimum 6 x D and when fixed minimum 4 x D.
- Minimum surface temperature fixed and moved from -40°C to maximum conductor temperature +90°C.



### WindFlex® Global 0.6/1kV LSOH

#### Application

Flexible halogen free rubber cable for use in wind turbines at medium mechanical stress and in torsion applications.

#### Construction

- Approval according to cUL Style 21465, AWM UL 758 similar to DIN VDE 0250 and DIN VDE 0282 Part 13 VDE Reg. No. 8143.
- Conductor made of plain copper, fine wire class 5 acc. IEC 60228.
- Insulation made of rubber compound type Class 28 UL, Type 3G13 acc. to DIN VDE 0207 part 20.
- Inner Sheath made of rubber compound type GM1b acc. to DIN VDE 0207 part 21.
- Outer sheath made of rubber compound type HXM1 cUL Style 21465.
- Bending radius when moved minimum 6 x D and when fixed minimum 4 x D.
- Minimum surface temperature fixed and moved from -40°C to maximum conductor temperature +90°C.



### WindFlex® MV Power 6 - 35kV

#### Application

Flexible medium voltage rubber cable for use in wind turbines at medium mechanical stress and in torsion applications. Standard or halogen free version.

#### Construction

- Conductor made of plain copper, fine wire class 5 acc. to IEC 60228.
- Insulation made of rubber compound type 3G13 acc. to DIN VDE 0207 part 20 or HEPR super clean acc. to IEC 60502-2.
- Inner sheath made of rubber compound type GM1b acc. to DIN VDE 0207 part 21.
- Outer sheath made of rubber compound type 5GM3 acc. to DIN VDE 0207 part 21 or halogen free compound HXM1 acc. to DIN VDE 0266.
- Bending radius when moved minimum 10 x D and when fixed minimum 6 x D.
- Minimum surface temperature fixed and moved from -40°C to maximum conductor temperature +90°C.



## WindFlex® Cable Specifications

### WindFlex® Global 0.6/1kV

Cores x cross-section mm²	Cable diameter mm	Weight kg / km
1 x 120	22.5 - 25.5	1460
1 x 240	30.0 - 33.0	2760
3 x 70	39.5 - 43.5	3420
3 x 240	68.0 - 74.0	10600

Note additional cross-sections and number of cores are available on request.

### WindFlex® Global 0.6/1kV LSOH

Cores x cross-section mm²	Cable diameter mm	Weight kg / km
1 x 120	22.5 - 25.5	1490
1 x 240	30.0 - 33.0	2800
3 x 70	39.5 - 43.5	3470
3 x 240	68.0 - 74.0	10700

Note additional cross-sections and number of cores are available on request.

### WindFlex® EMC 0.6/1kV LSOH

Cores x cross-section mm²	Cable diameter mm	Weight kg / km
3 x 70/35	41 - 46	3850
3 x 150/50	55 - 60	7200

Note additional cross-sections and number of cores are available on request.

### WindFlex® MV Power 6 - 35kV

Cores x cross-section mm²	Cable diameter mm	Weight kg / km
3 x 25/25	59 - 65	5900
3 x 70/70	75 - 81	8950

Note additional cross-sections and number of cores are available on request.

**Options for Windflex MV Power:** Available as a four core cable with three phase conductors and one earth conductor or as a three core cable with the earth conductor made as a spiral of copper wires outside each core, which gives a thinner and lighter cable. Also available with EPR core insulation type 3G13 or with super clean HEPR insulation allowing for reduced insulation thickness and thus, a thinner and lighter cable.

#### Electrical data

Nominal voltage	0.6/1 kV
Conductor temperature	+90°C
Maximum short circuit temp.	+250°C
Design standard	HD 22, UL
Behavior on fire acc. to	IEC 60332-1/2
Oil resistance acc. to	IEC 60811-2-1
Ozone resistance acc. to	IEC 60811-2-1
UV resistant	Yes

#### Electrical data

Nominal voltage	0.6/1kV
Conductor temperature	+90°C
Maximum short circuit temp.	+250°C
Design standard	DIN 0250/0280 UL
Behavior on fire acc. to	IEC 60332-1/2
Smoke density acc. to	IEC 61034-2
Corrosive gases acc. to	IEC DIN EN 50267-2
Oil resistance acc. to	IEC 60811-2-1
Ozone resistance acc. to	IEC 60811-2-1
UV resistant	Yes

#### Electrical data

Nominal voltage	0.6/1kV
Conductor temperature	+90°C
Maximum short circuit temp.	+250°C
Design standard	DIN 0250, HD 22,4
Behavior on fire acc. to	IEC 60332-1/2
Smoke density acc. to	IEC 61034-2
Corrosive gases acc. to	IEC DIN EN 50267-2
Oil resistance acc. to	IEC 60811-2-1
Ozone resistance acc. to	IEC 60811-2-1
UV resistant	Yes

#### Electrical data

Nominal voltage	3.6/6kV & 8.7/15kV 12/20kV & 20/35kV
Conductor temperature	+90°C
Maximum short circuit temp.	+250°C
Design standard	DIN VDE 0250 P813
Behavior on fire acc. to	IEC 60332-1/2
Oil resistance acc. to	IEC 60811-2-1
Ozone resistance acc. to	IEC 60811-2-1
UV resistant	Yes