

ERITECH[®]

Lightning Protection for Wind Turbine Blades



ERICO[®]

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Wind turbines are subjected to some of the **harshest weather and environmental conditions possible**. Their remote locations and ever-increasing size, which easily make them the tallest structure in their vicinity, dramatically increase the probability of being struck by lightning. Because of these factors, it is often not a matter of “if” but “when” a wind turbine will be struck by lightning.

Lightning can produce very brief but extraordinarily high temperatures, often more than 30,000°C. Statistics have shown that more than 90% of lightning strikes to a wind turbine connect with the blade. Repairs can quickly reach costs as much as \$30,000 and can take multiple days to complete. Repair costs are an even larger concern in offshore applications. In addition to repair costs, an out-of-service turbine costs the wind farm in productivity during the time the turbine is unable to generate its designed power.

ERICO – A Global Leader

Years of experience in the fields of lightning protection, low voltage power distribution and reinforced concrete construction, combined with global manufacturing capabilities, allow ERICO to provide comprehensive solutions for the wind energy industry.

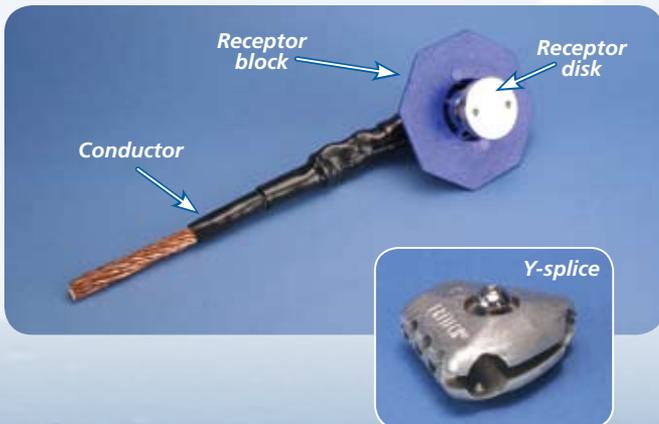
ERICO is recognized as a world leader in the design of lightning protection and grounding products, and has focused on developing a variety of innovative systems to minimize the damage and downtime to wind turbines.

ERICO’s products meet or exceed the engineered requirements of the largest wind turbine manufacturers and are tested to the new IEC® standards. The ERITECH® brand of blade lightning protection products are installed in more than 25,000 blades globally. ERICO is a premier source for design support, continuous research and development, and the manufacture and assembly of complete lightning protection assemblies.

Protect the Blade – Innovative Receptor Assembly

To help prevent damage and minimize the need for costly repairs and downtime, ERICO has developed a wind turbine blade lightning protection system. The innovative receptor assembly is tested to IEC® 61400-24, compliance required by Germanischer Lloyd for GL Certification. It is also tested for 20-year estimated service life in accordance with IEC requirements for Arc Entry and Conducted Current Tests.

The system is designed to help minimize the probability of streamer initiation inside of the blade where the receptors serve as the strike termination device and earthing conductor connection point. The highest voltage stress in ERICO’s system is located at the external facing receptor disk while the conductive components internal to the blade are insulated and shielded to minimize the electrical field stress. This helps reduce the likelihood of launching an upward leader from within the blade and damaging the blade structure.



Receptor features:

- Long-life, field replaceable disk
- Insulation and retention of receptor mount
- Integral blade mounting provisions
- Field stress reduction coupled with electrical isolation
- Unique installation process

The most important feature of the wind turbine blade receptor assembly is the smoothing of the electric field around the lug attachment to help eliminate the internal downconductor connection as a leader attachment point.

Main components include:

- Receptor block assembly
- Receptor disk
- Branch conductor
- Root conductor
- Y-splice



Lightning Protection for Wind Turbine Blades

Flexibility: A System to Meet Your Needs

Wind turbine blades are available in a variety of shapes and sizes, meaning a lightning protection system must offer flexibility in its products to provide the highest level of confidence. ERICO's wind turbine blade receptor assembly can be used on any blade design and can be customized to meet a variety of needs.

When standard rope lay cable is used as the conductor for a high-frequency transient event, such as lightning, the cable is subject to a "skin effect." This unwanted phenomenon means the current travels on the surface of the conductor and the center of the cable is not used, which increases the risk of sideflashing. ERICO's smoothweave conductor addresses this with a unique inner to outer weave of the strands. This weave also results in a conductor with less memory that allows better positioning within the blade.

Copper conductors are recommended for highly corrosive environments such as offshore wind farms.

CABLE



- = Conductor
- = Reduced Conductivity
- = Insulation



Aluminum Smooth Weave

- First insulated conductor to receive UL[®] 96 Listing
- Aluminum 70 mm² cross-sectional area
- Strand diameter: 1.66 mm minimum
- Insulation rated:
 - Temperature: -40 to +105 °C,
 - Flame rating: UL 94 V0 or UL 1581 VW-1
 - Dielectric strength: 20 kV/mm minimum per IEC 243-1 (eq. ASTM[®] D149)
- Terminates well at all splice points
- Wires weave from center to edge
- Increased cable diameter means reduced inductance
- Weaving minimizes "skin effect"
- Easily forms and holds sweeping bends to minimize inductance from sharp bends



Copper Smooth Weave

- UL 96 Listed
- Copper 50 mm² and 70 mm² cross-sectional area
- Strand diameter: 1.63 mm minimum
- Insulation rated:
 - Temperature: -40 to +105 °C
 - Flame rating: UL 94 V0 or UL 1581 VW-1
 - Dielectric strength: 20 kV/mm minimum per IEC 243-1 (eq. ASTM D149)
- Terminates well at all splice points
- Wires weave from center to edge
- Increased cable diameter means reduced inductance
- Weaving minimizes "skin effect"
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Made-to-Order Kits

ERICO has simplified the process of ordering the necessary parts for each wind turbine blade receptor assembly with made-to-order kits. Contact your local ERICO representative for full details.

WARNING

ERICO products shall be installed and used only as indicated in ERICO's product instruction sheets and training materials. Instruction sheets are available at www.erico.com and from your ERICO customer service representative. Improper installation, misuse, misapplication or other failure to completely follow ERICO's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death.

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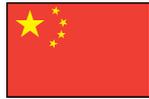
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