International

Coating systems for your wind energy assets

RELEST® blade protection range

AkzoNobel

The benefit of working with AkzoNobel

Across the world AkzoNobel is known for supplying sustainable and innovative paint and coatings solutions that our customers, communities – and the environment – are increasingly relying on. Our world class portfolio of brands – including International®, Sikkens® and Awlgrip® along with product ranges like RELEST® – are trusted by customers around the globe across a range of markets including energy, infrastructure and marine. We're active in more than 150 countries and have set our sights on becoming the global industry leader. It's what you'd expect from a pioneering paints company that's committed to science-based targets and is taking genuine action to address globally relevant challenges and protect future generations.

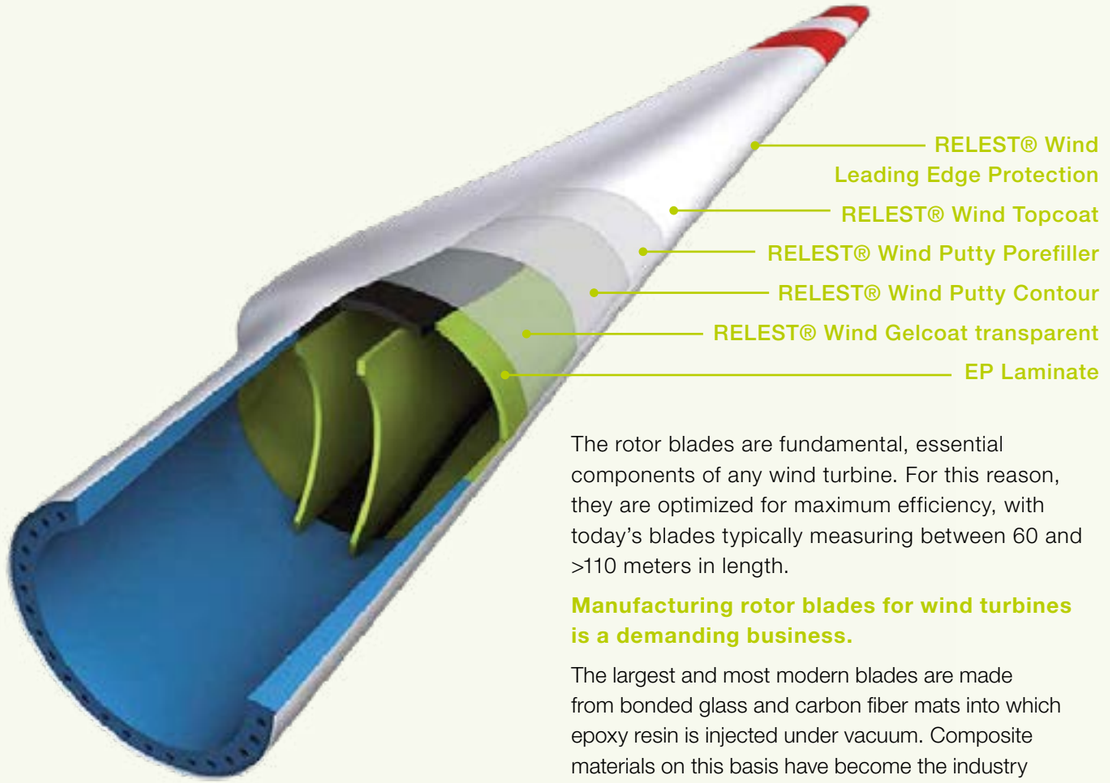
AkzoNobel is recognized as the sustainability leader in our industry. Our approach to sustainable business is designed to contribute to the global agenda represented by the United Nations Sustainable Development Goals (SDGs).

We are the only paints and coatings company rated "AAA" by MSCI, the highest possible rating.

We are considered "low risk" by Sustainalytics, the best performance level in our industry.

AkzoNobel is in the top 1% of more than 65,000 companies assessed by EcoVadis across all industries.

How rotor blades defy the forces of nature



Considering the central role of renewable energies, wind energy has taken on new significance. Intensive efforts are underway to boost its competitiveness with respect to other sources of energy, with turbines becoming increasingly bigger and more powerful.

The rotor blades are fundamental, essential components of any wind turbine. For this reason, they are optimized for maximum efficiency, with today's blades typically measuring between 60 and >110 meters in length.

Manufacturing rotor blades for wind turbines is a demanding business.

The largest and most modern blades are made from bonded glass and carbon fiber mats into which epoxy resin is injected under vacuum. Composite materials on this basis have become the industry standard. The RELEST® products from AkzoNobel's International® range have been developed specifically for this process. The blades are built according to the sandwich construction principle and are stabilized with reinforcing spars and bars on the inside. This high-tech construction technique also provides exceptional stability and flexibility. The finish consists of multi-layer polyurethane-based coats, with different erosion and UV resistance, depending on requirements. The coatings' excellent adhesion properties minimize the risk of stress cracking. In addition, their flexible behavior prevents them from flaking off, despite rotor tip vibrations that cause them to bend by several meters. **Our products thus provide lasting protection for operating times of up to 25 years.**

Whatever your challenge, we have the solution. From gelcoat, putty or topcoats.

RELEST® Wind ProcessCoat

- Solvent-free and translucent 2K polyurethane gelcoat for use as in-mold gelcoat with low film thicknesses
- Significantly easier to sand than glass-fiber reinforced epoxy substrates
- Tinted hardener for mixing control – quick visual inspection of the mixing process (manual and automated application)
- Use of the new generation of UV absorbers – temporary outdoor storage of uncoated rotor blades, without the risk of UV light damaging the substrate
- VOC compliant

RELEST® Wind Gelcoat transparent

- Solvent-free 2K polyaspartic gelcoat for use as in-mold gelcoat
- Significantly easier to sand than glass-fiber reinforced epoxy substrates
- Transparent processcoat – suitable after demolding for checking the rotor blades produced in the vacuum-infusion process
- VOC compliant
- Large application window – offers good flow and fast curing on large surfaces
- Pore-free surface after demolding – can be topcoated without any additional working steps

RELEST® Wind Gelcoat RA

- Solvent-free 2K polyaspartic gelcoat
- Film thicknesses of approximately 200µm can be achieved in one step with optimal flow properties
- Quick visual inspection of the mixing process

RELEST® Wind Putty Porefiller

- Solvent-free 2K polyurethane porefiller for filling pinholes (of different sizes), visual inspection
- Compatible with all systems
- Recoatable without sanding
- VOC compliant
- In 2K cartridges for direct application of small quantities
- Quick visual inspection of the mixing proces

RELEST® Wind Putty Contour

- Solvent-free, highly viscous polyurethane putty for smoothing surface and contour irregularities
- Suitable for manual (3K) and mechanical (2K) application
- Rapid curing – product is quickly ready for further processing and recoating
- Damages of up to 10mm can be repaired in one step, depending on application method
- Quick visual inspection of the mixing process (manual and mechanical application)

RELEST® Wind Putty Protect

- Solvent-free, highly viscous polyurethane putty for smoothing surface and contour irregularities
- Advanced rain erosion resistance for advanced leading edge protection demands
- Rapid curing – product is quickly ready for further processing and recoating
- Damages of up to 10mm can be repaired in one step, depending on application method
- It is the optimal product for a sustainable edge protection system
- Best rain erosion resistance putty for use in OEM as well as in particular for repairs
- Cartridges for the easy to use approach

RELEST® Wind WB Topcoat LI

- Matt waterborne 2K acrylic polyurethane topcoat for use as finishing coat on rotor blades
- Low Isocyanate content in mixture
- Dries fast and is quickly ready for recoating, even at high film thicknesses without the risk of blistering
- Excellent UV and weathering resistance
- Suitable for roller and spray application
- Good coverage of substrate imperfections
- Very low VOC content

RELEST® Wind Leading Edge Protection

- 2-component solvent-free polyurethane coating gives excellent protection from erosion, sand and water
- VOC compliant
- Supplied in 2-component cartridges for direct application of minimal quantities without weighing
- Good UV and weathering resistance

RELEST® Wind UHS Topcoat

- Matt 2K ultra high solids polyurethane topcoat for use as finishing coat on rotor blades
- Exceptionally high resistance to regeneration for the highest demands on leading edge and blade protection
- Good UV and weathering resistance
- Suitable manual and robotic spray application and roller application for maintenance areas
- Low VOC content (ultra-high solids content)

RELEST® Wind Gelcoat Edge

- Solvent-free 2K polyaspartic gelcoat
- Film thicknesses of approximately 125µm can be achieved by roller application in one step with optimal flow properties
- Advanced rain erosion resistance for advanced leading edge protection demands
- Outstanding properties for optimal substrate pretreatment of the Leading Edge in OEM as well as in repair applications
- Best adhesion to optional foil-based leading edge protection solutions

RELEST® Wind HS Topcoat

- Matt 2K high solids acrylic polyurethane topcoat for use as finishing coat on rotor blades
- Dries fast and is quickly ready for recoating, even at high film thicknesses without the risk of blistering
- Good UV and weathering resistance
- Suitable for roller and spray application
- Low VOC content (high solids content)
- Excellent erosion protection
- High film thicknesses with good flow properties in one working step

Very high abrasion resistance
Outstanding flexibility
Top level UV resistance

It all comes down to the finish

One thing all our customers have in common is the drive to design a high quality end product in a way that is economical, ecologically sound and innovative. Accordingly, we offer a product system that combines several different procedures and methods, so it can be adapted to individual production processes.

At present, the most widely used process is vacuum infusion. In this process, two half-shells are charged with release agent. The shells are lined with glass-fiber mats and other reinforcing materials. A plastic film is then used to seal the molds airtight.

Afterwards a vacuum pump sucks an epoxy resin and hardener mixture into the mold and into the glass-fiber mats. The blades are then hardened at approximately 70°C (158°F) and the two blade halves are bonded together.

In the next step, the rotor blade can be protected from environmental factors, such as moisture and light by a gelcoat. Small irregularities on the surface are smoothed with the putty. A coating that protects the edges against wear is applied, followed by application of a topcoat in the final step.

We partner with many of the most important rotor blade manufacturers across all continents. However, this also means that our products must function as reliably in the deserts of Arizona as they would in the North Sea, with life cycles of up to 25 years. To this end, the quality requirements for RELEST® products depend on multiple factors, including;

- Region of use
- Highly diverse climatic conditions
- Different application fields
- Ongoing changes to blade sizes

Naturally, quality assurance based on recognized testing methods is a vital factor in this process, but what can be done when there are no established testing procedures? We create our own solutions.

This is how the ‘helicopter testing device’ was developed for use in testing the rain erosion resistance of our products.

In this custom-built unit, several coated test specimens are placed on a rotating disc. The entire unit then rotates at up to 500 km/h through a curtain of water drops – for many hours. All coatings must undergo this endurance test.

Minimizing downtime and maximizing time in-service is the objective

Reap the rewards associated with using high tech systems with:

- High abrasion resistance and elasticity – resulting in optimal protection from sand and rain erosion, as well as stress cracking
- Exceptionally long product life – product cycles of up to 25 years are achieved even under extreme conditions
- Simple, flexible application – whether brushed, sprayed or using robotics
- Individual solutions – you will find exactly the right product for your requirements

Consistent high level of product quality.
Guaranteed process reliability.
Process-oriented solutions worldwide.

RELEST® product range

	Wind ProcessCoat	Wind Gelcoat transparent	Wind Gelcoat RA	Wind Putty Porefiller	Wind Putty Contour	Wind WB Topcoat LI	Wind HS Topcoat	Wind UHS Topcoat	Wind Putty Protect	Wind Gelcoat Edge	Wind Leading Edge Protection
Spray application											
In-mold process	✓	✓									
Repair/filling of pinholes				✓	✓				✓		
Intermediate coat											
Surface finish						✓	✓	✓			
Leading edge protection										✓	✓
Roller application											
In-mold process	✓	✓									
Repair/filling of pinholes				✓	✓				✓		
Sealant/intermediate coat for rotor blades			✓								
Surface finish						✓	✓	✓			
Leading edge protection										✓	✓
Repair											
Repair/filling of pinholes				✓	✓				✓		
Sealant/intermediate coat for rotor blades			✓								
Surface finish						✓	✓	✓			
Leading edge protection										✓	✓

AkzoNobel's International® brand is one of the world's leading marine, yacht and protective coatings brands. A long-standing brand synonymous with innovation and collaboration, it is the preferred choice of industry leaders looking for excellence and expertise.

We deliver anticorrosive and fire protection, fouling control technologies and aesthetic solutions for on and offshore. Supported by high quality customer service and in-field support around the globe, our technologically advanced International® product range strives to satisfy our customers' needs now and in the future.

International® Propelled by curiosity

www.international-pc.com