

Rain erosion resilience by PolyTech

Rain erosion on wind turbine blades - overcoming the challenge

During its lifetime, a wind turbine blade is subject to continual wear - a constant collision with raindrops, dust particles, hailstones, insects - and more. Strong resistance to this highly corrosive exposure is crucial for the protective paint coating on its surface, particularly the leading edge.

Choosing the right coating is essential to maximise lifespan, protect guarantees and control costs.

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Invest in the most effective coating

Superior testing

Turbines are installed in so many different environments, it is impossible to simulate them all. So PolyTech tests for rain erosion with a whirling-arm rig, specifically for testing coats.

Three pieces of leading edge blade sample 225mm long are coated and attached to the rotor.

The rotor is accelerated up to a speed specified by the customer (typically 160 m/s at the tip). Nozzles simulate the anticipated rain conditions, simulating droplet size and rainfall intensity.

The test is interrupted at 30-minute intervals, or per customer instructions, to capture pictures and measurements. Control criteria are referenced after every tenth test, to ensure physical wear is within limits and that the test is repeatable.

The resulting parameters are measured, logged and noted in the final report.

- Velocity:
 - Tip 160 m/s
 - Centre 143 m/s
 - Hub 126 m/s
- Temperature variation: 20-25 °C
- Water pressure (bar)
- Motor speed (rpm)
- Droplet size: 1-2mm

How test samples are specified:

The 225mm test sample length allows a wide speed range to be evaluated. Typically, a tip speed of 160m/s gives a centre speed of 143m/s and a hub speed of 126m/s. These variations

make it possible to measure the exact erosion rate - i.e., predict the likely level of blade damage.

PolyTech supplies aluminium and glass reinforced plastic samples which can be used for tests.

Satisfies ASTM International G73-10 test standard

PolyTech tests are conducted according to the new ASTM G73-10 benchmark, the only recognised industry standard at the moment. This test is widely accepted as the most suitable for evaluating the anti-erosive properties of coatings on the leading edge of wind turbine blades.

Independent third party testing

PolyTech acts as an impartial third party test institute for coating suppliers, blade manufacturers or OEMs - deliberately testing blind with no prior knowledge of coating or materials. Samples are received and tested per customer needs, with a report generated to include pictures, measurements and the returned test samples.

