LM WIND POWER

PRODUCT INFORMATION TECHNICAL DATA SHEET FOR

ProBlade Ultra

Superior LE Protection | Easy & Fast Installation | Higher Lifetime Value

What is ProBlade Ultra?

ProBlade Ultra is a leading-edge protection material made from an elastomeric and resilient polymer. It is used to protect wind turbine blades from damage caused by repeated impacts from rain droplets, sand, and hail.

ProBlade Ultra is applied to the blade using a strong and durable pressure sensitive adhesive allowing for versatile installation.

ProBlade Ultra is qualified by LM through extensive testing and ProBlade Ultra complies with the DNVGL-RP-0573 standard.

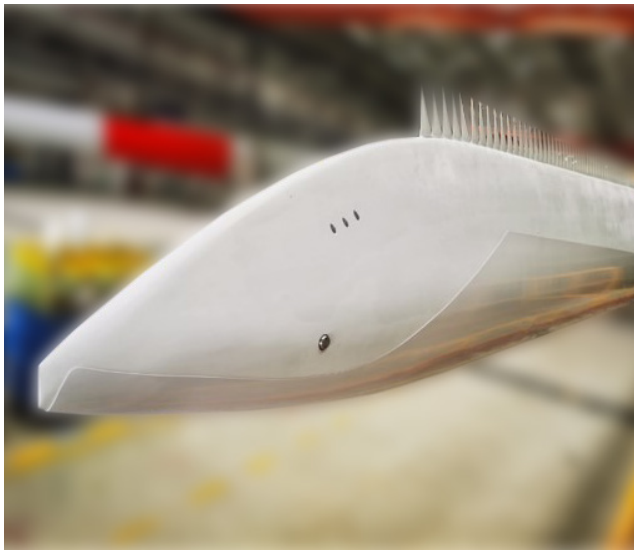
The material choices behind ProBlade Ultra ensures that the product, besides its excellent erosion resistance, has outstanding low temperature flexibility, is resistant to microbial degradation and exceptional weathering resistance with no observed loss in erosion performance and no visible discoloration.

The design of ProBlade Ultra

The molecular structure of ProBlade Ultra is the secret behind its performance characteristics. The materials have been carefully chosen by LM material engineers to maximise the performance and endurance in harsh environments.

ProBlade Ultra is easy install. No need of edge sealants or fillers during installation, i.e. faster, cleaner and wider application window. The specially made polyethylene split liner ensures a fast and reliable application while at the same time protecting the adhesive during storage and handling.

The product is available in pre-cut segments of various lengths and shapes for service installation. For larger (or) full length field repairs, the segments are secured together by an overlap piece made of the same material and adhesive. ProBlade Ultra does not require much preparation on LE.
It can be installed on Gelcoat, filler as well as other topcoats.



PROBLADE-ULTRA CHARACTERISTICS	
LEP Material	Polymer
Adhesive	Pressure sensitive adhesive
Properties	Elastomeric and tough, produced to fit any blade
Shape	Comes in different shapes
Tip section	Specially cut tip sections to accommodate blade curvature
Colour	RAL7035

Safety and Regulatory

This product is an article that does not release or otherwise result in exposure to a hazardous chemical under normal use conditions.

Shipping and Storage

No special/hazardous labeling or packaging required for air, ground, or water shipment of this product. Keep film in a clean area, away from excessive moisture and out of direct sunlight. Store material in the shipping carton. When kept in original packaging, shelf life is greater than 18 months.

Material Properties of ProBlade Ultra (typical values)

Property	Unit	Value	Test Method
Tensile Strength	MPa	> 40	ISO 527-3
Elongation at Break	%	> 400	ISO 527-3
Weight pr square meter (un-applied)	kg/m2	~ 2	-
Peel Strength to Typical Blade Surface	> 15	N/cm	ASTM D3330-A
Peel Test Failure Mode	Cohesive	Visual	ASTM D3330-A
Surface Roughness, Ra	µm	< 2	ISO 4287
Surface Roughness, Rt	µm	< 10	ISO 4287

Erosion and Fatigue Properties of ProBlade Ultra (typical values)

Property	Unit	Value	Test Method
Real speed (Vtip 90 m/s) Erosion Resistance with butt joint, Tested at 2.3 mm droplets [1]	Hours	> 550	DNV GL RP 0171
ALT Erosion Resistance with butt joint. Tested at 2.3 mm droplets.[1]	Hours	> 130	DNV GL RP 0171
ALT2 Erosion Resistance with butt joint after 25 weeks of Exposure to ISO 12944-9. Tested at 2.3 mm droplets.[1]	Hours	> 130	DNV GL RP 0171
Simulated Hail Impact Resistance, Ø6 mm steel particles	Impacts	> 100	Internal LM method
Fatigue at R=0.1, at -30°C	Cycles	> 250.000	ISO 13003 ISO 527-4

Material Properties of ProBlade Ultra (typical values)

Property	Unit	Value
Application Temperature	°C	8 - 38
Application Humidity	-	Dry surface reqd. only for promoter application
Service Temperature During Operation	°C	-35 to +55
Service Temperature During Standstill or Storage	°C	-50 to +70

Disclaimer:

All the technical information and recommendations in this technical data sheet is considered typical values and are not legally binding. None of the values in this technical data sheet should be used as design values nor for specification purposes. This technical data sheet offers no warranty nor liability towards any use of ProBlade Ultra without written agreements from LM Wind Power.

1 : Polyester gelcoat, SikaForce 7800, ProBlade
2 : ALT: Accelerated Life-time Testing (Vtip 106 m/s)