# TEKNOBLADE REPAIR 9000

## - a practical approach to Leading Edge Protection for wind turbine blades

# Course and effect of rain erosion

- Rain, hail, ice, UV-light, water absorption and other climatic conditions may erode the leading edge on wind turbine blades

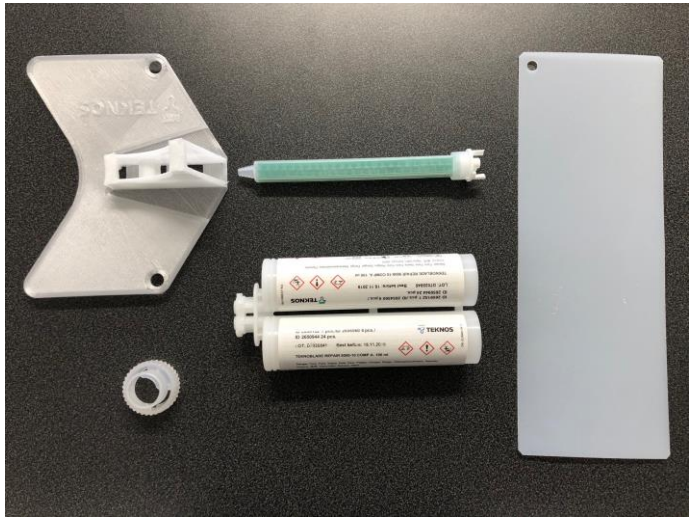
- Risk of reduced yield, structural damage and economical loss from downtime

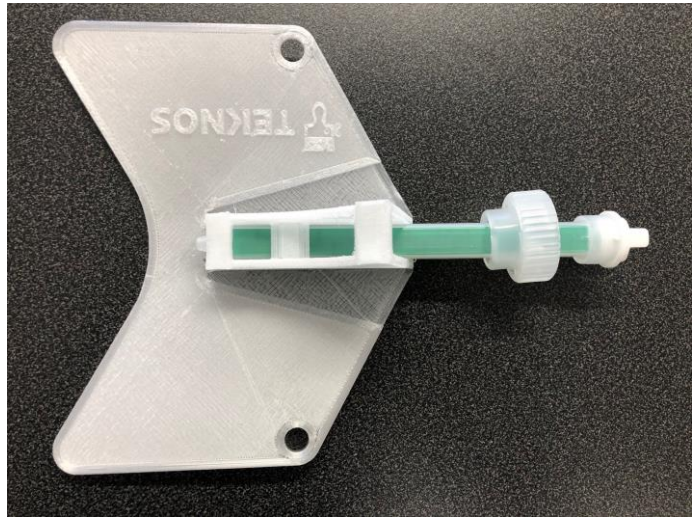
# The solution

## The TEKNOBLADE REPAIR 9000-20, a manually applied polyurea coat

- Single layer of 2000 µ +/- 500 µ, re-coatable when needed
- Cures within minutes to an impact resistant coat
- Wide application window -8ºC to +50ºC, air and substrate temperature and 80 % RH
- Elongation (ISO 527-2) > 500 %
- Adhesion to GFRE (ISO 4624) > 5 MPa
- Ultra-low water up-take (up to 70ºC) < 2%
- RET, time to break trough (DNVGL-RP-0171_2018) > 10 hours@130m/sec
- Easy on-site quality control by shore A hardness measurement

# The solution, kit

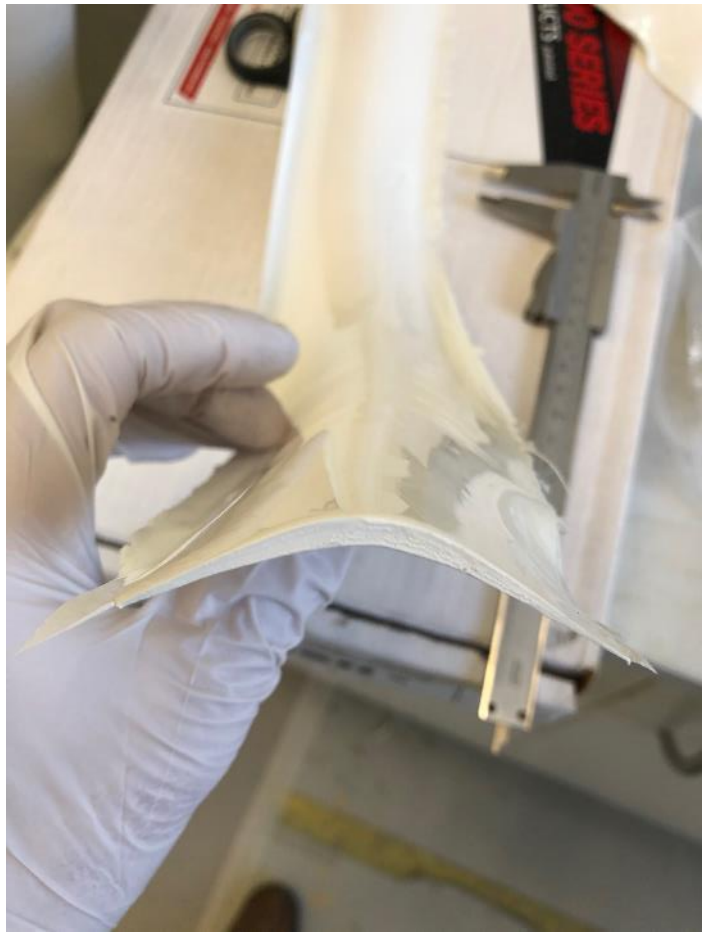


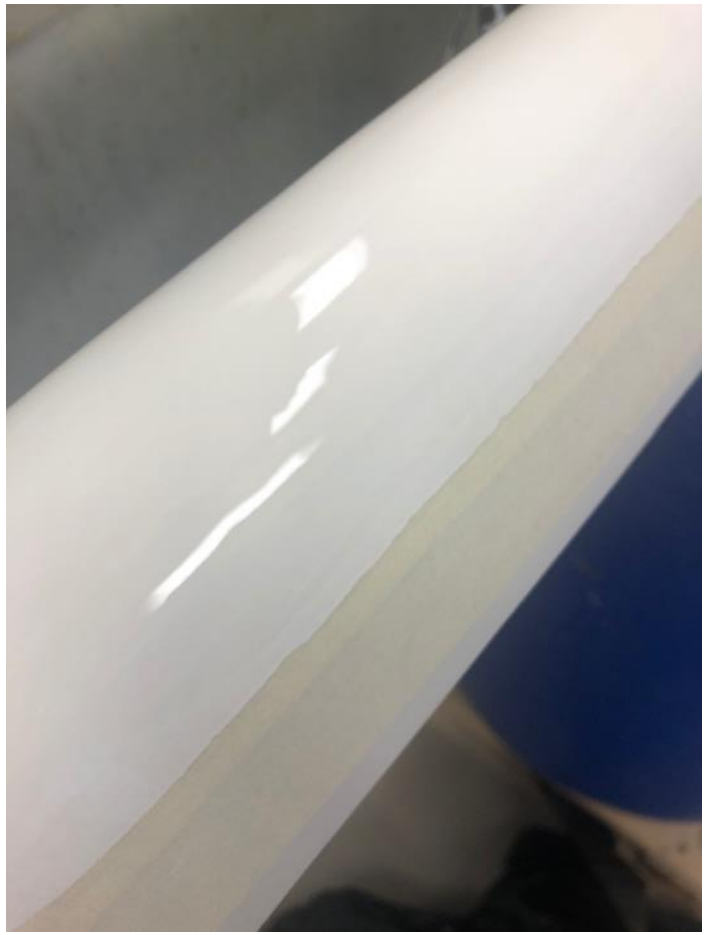


(short video: https://youtu.be/BBvHmBV_mmU)

# Preparation before and after

# TEKNOBLADE REPAIR 9000-20 for improved performance





# THE TEKNOBLADE REPAIR 9000-20 SOLUTION

## Fulfillment of requests for solution and coating properties:

- One product solution, filler and LEP in one product and one application
- Relatively simple to apply, possible to do by roping access.
- Ultra fast cure to minimizes working time and WTG down time
- Long service life, documented by thorough test program
- Easy on-site quality control of coating by Shore A hardness method
- No solvents, no manual premixing of product components

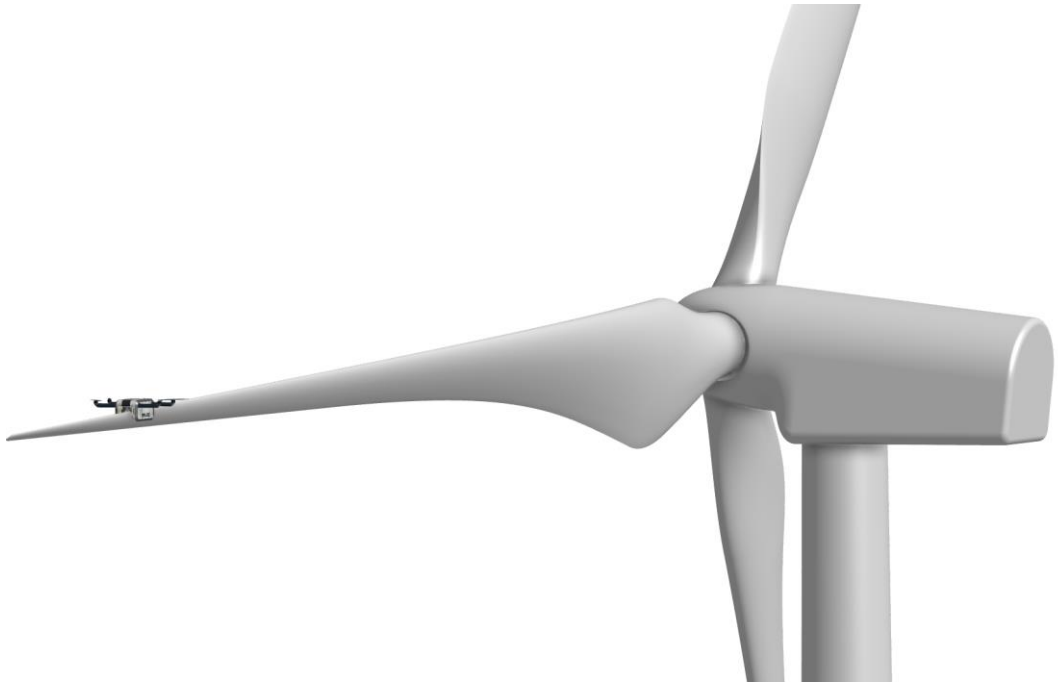
- and now in the white version with improved properties

# TEKNOBLADE Portfolio current developments

| | 9000-10 | 9000-20 | 9000-30 | 9000-40 |
|---|---|---|---|---|
| Status | Test material | Launced | In progress | Produced |
| Colour | Clear | White | White | White |
| Isocyanate | MDI | MDI | HDI | HDI |
| Gel time | 120 sec | 120 sec | ~120 sec | 40-50 sec |
| Tack free (2mm at 23°C & 50%RH) | ~6min | ~6min | ~6Min | ~90 sec |
| Time to start turbine | 4 h | 4 h | TBD | TBD |
| Full cure (2mm at 23°C & 50%RH) | 1 day* | 1 day* | 1 day* | <1 day* |
| Lowest cure temperature | -8°C | -8°C | TBD | TBD |
| Highest cure temperature | 50°C | 50°C | TBD | TBD |
| Thickness: | | | | |
| General | 2-3mm | 2-3mm | 2-3mm | 2-3mm |
| Lowest | 1.5mm | 1.5mm | 1.5mm | 1.5mm |
| Application method | Manual / Robot | Manual / Robot | Manual / Robot | Robot |
| RET test DNVGL RP-0171 | >10h | 10h | ? | 10h |
| RET test after Xenon exposure | <1h | 4h | ? | 6h |
| Color after Xenon exposure | Sever yellowing | Sever yellowing | Yellowing | Non yellowing |
| Available cartidges | 2/6/1500 ml | 2/6/1500 ml | | (2/6/1500 ml) |
| DNVGL-CP-0424 | tested | tested | TBD | tested |
| DNVGL-RP-0573 | ? | ? | ? | ? |
| * > 90% af final hardness | | | | |
| ** Speed of sound, 160m/s, fatique, 12944-9, peel | | | | |

# Robotic solutions

- Reblade:
  - 5 meters pr. Minute drone solution (preparation and application of TEKNOBLADE 9000-40



# Robotic solutions

- RopeRobotics
  - Partially suction/rope solution
  - Currently operational in North America and Europe
  - Growing business fast and gaining track record
  - Using TEKNOBLADE REPAIR 9000-20

# Teknos Team and contact Global and the Netherlands

Teknos B.V.

H. ter Kuilestraat 181

NL-7547 SK  ENSCHEDE

THE NETHERLANDS

Tel. +31 53 433 4422

sales.nl@teknos.com

## Global TCG Energy

Clare McDermott

Business Development Director, Energy

Allan Bonde Jensen

Business Development Manager, Energy

https://www.teknos.com/industrial-coatings/industries/energy/wind-power/

## SALES TEAM

Olaf Vester
Sales Director

+316 82 534 318
olaf.vester@teknos.com

Albert Vorgers
Technical Sales Representative

Regio: FR / GR / DR / OV / GD
(ten oosten van Apeldoorn)

+316 51 014 304
albert.vorgers@teknos.com

Ronald Kouwenhoven
Technical Sales Representative

Regio: NB / LB / ZL / België
/ Luxemburg

+316 22 245 509
ronald.kouwenhoven@teknos.com

Mark Keijzer
Technical Sales Representative

Regio: Wadden-eilanden / NH
/ ZH / UT / GD (ten westen van
Apeldoorn )/ FL
+316 13 745 944
mark.keijzer@teknos.com

Raymond Smithjes
Sales Representative Interior

Regio: Benelux

+316 82 530 963
raymond.smithjes@teknos.com

Berry van Dijk
Technical Service Specialist

Regio: Benelux

+316 82 257 720
berry.vandijk@teknos.com

Johan Nienhuis
Technical Service Specialist

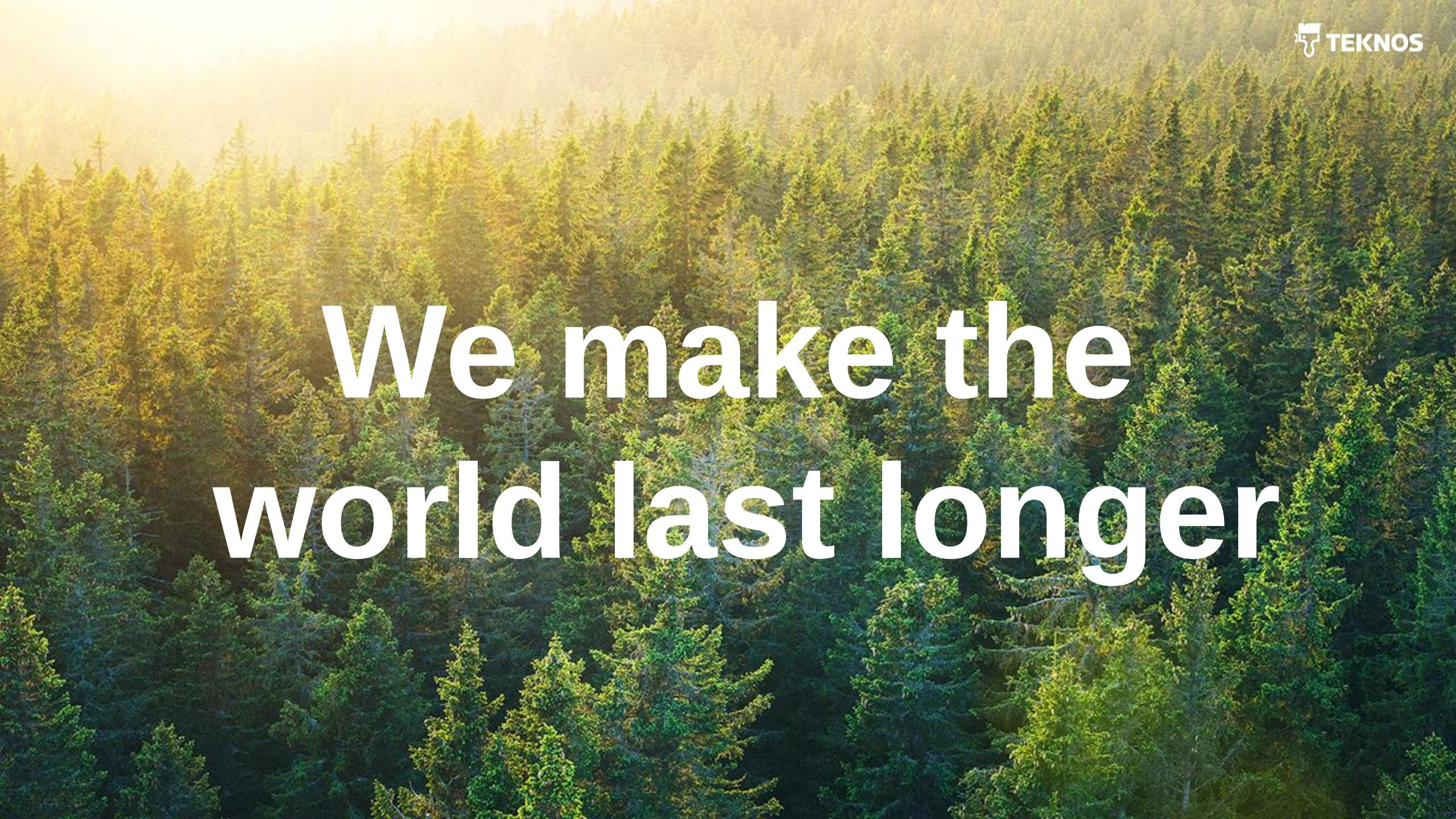
Regio: Benelux

+316 14 743 765
johan.nienhuis@teknos.com

Marc Renkens
Technical Service Specialist

Regio: Benelux

+316 12 442 980
marc.renkens@teknos.com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world last longer