

your global specialist

Proven track record

- Klübersynth GEM 4-320 N has been used successfully across the globe in diverse conditions and by a majority of major wind turbine OEMs
- Klübersynth GEM 4-320 N is approved by nearly all major gearbox OEMs in the wind industry

Your benefits

- Long lasting gear oil, more than 6 years drain interval
- Longer life and improved reliability of gearbox
- Reduced downtime of turbines and significantly lower maintenance costs
- State of the art oil condition analysis

Klüber Lubrication is present worldwide.
Please meet our wind energy experts.

<http://www.klueber.com/en/contact>

Local presence. Global competence.

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Premium gearbox lubrication.

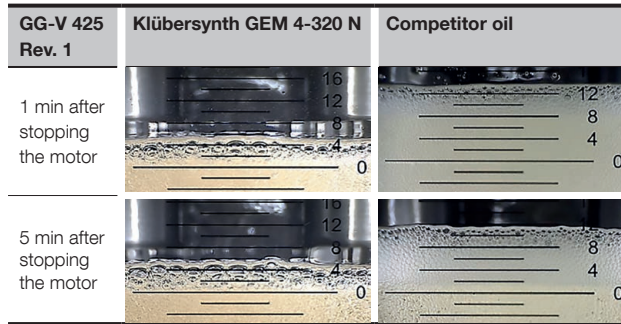
Klübersynth GEM 4-320 N gear oil



Overcoming the 4 main challenges in wind turbine gearboxes

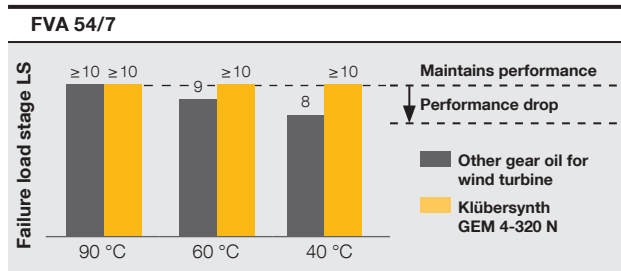
1 Foaming

The tendency of an oil to foam reduces its lubricating properties. Klübersynth GEM 4-320 N overcomes this problem with its excellent anti-foaming properties as demonstrated in the Flender foam test. Furthermore, it also fulfills the filtration test requirements of CC Jensen and Hydac.



2 Micropitting

Operators are often faced with micropitting, which bears a risk of follow-up failures. With its advanced additives, Klübersynth GEM 4-320 N offers a high micropitting resistance of load stage \geq LS 10 (GFT "High") according to FVA 54/7 over a wide temperature range. Furthermore, it maintains a GFT "High" result even after more than 6 years of use in the gearbox.



3 Residue formation

Some gear oils contain additives that may break down, form residues and cause problems in operation. Our product has been developed as a combination of carefully tuned pure base oils and advanced additive technologies ensuring minimum residue formation.

Klübersynth GEM 4-320 N High-performance PAO



Clean appearance



Brownish discolouring

4 Bearing wear

The right gear oil contributes decisively to preventing bearing failures and replacements. Klübersynth GEM 4-320 N passed the most demanding FAG 4 stage test with excellent results, confirming the optimum bearing protection of this oil against wear and premature fatigue.

Stage	FAG 4 stage test criterion	Test	Result (1 = best, 5 = failed)	
1	Wear at boundary lubrication	FE8 80h	1.0	passed
2	Fatigue behaviour at mixed condition	FE8 800h	1.0	passed
3	Fatigue behaviour at EHL condition	L11 700h	1.0	passed
4	Fatigue behaviour and residues with water added	FE8 WT	1.0	passed
Summary			1.0	passed