



RAVENOL SWT

ISO 150 | 220 | 320 | 460 | 680

Synthetic Wind Turbine – Technical Report

www.ravenol.de



RAVENOL SWT | APPROVALS

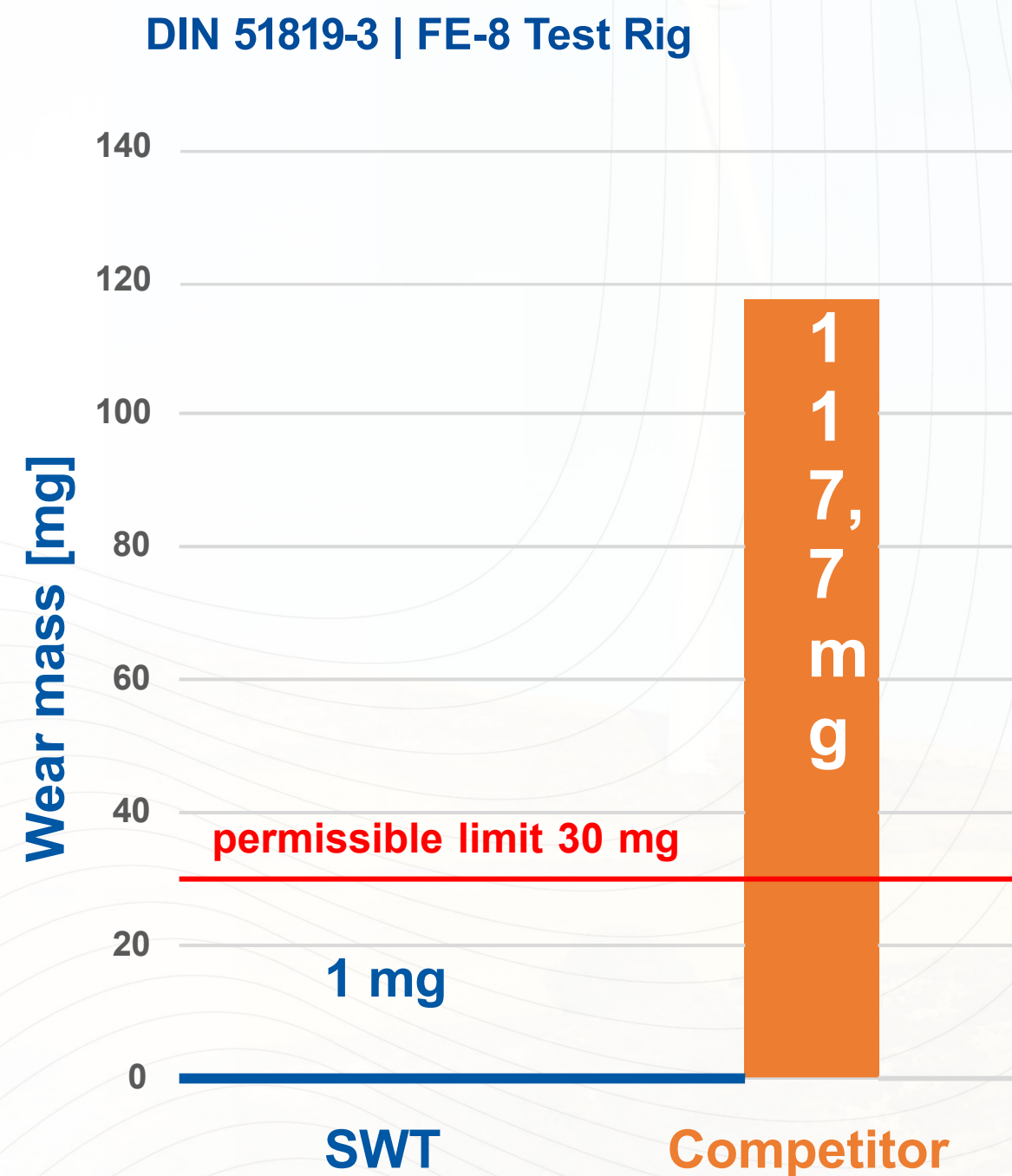
Mastering the most extreme demands across the entire application range – RAVENOL targets a Multi-Specialist-Approach with SWT that far exceeds every single standard.

Approval	Ravenol SWT 150	Ravenol SWT 220	Ravenol SWT 320	Ravenol SWT 460	Ravenol SWT 680
Eickhoff Gearboxes QSV19.0002	•	•	•	•	•
FLENDER AS 7300	•	•	•	•	•
Renk 36011-11	•	•	•	•	•
Renk Augsburg ZAN 36011	•	•	•	•	•
SEW gear units: IGP, XP, P-X-Series	•	•	•	•	•
SEW gear units: R-, K7-, F-, IG X-Series	•	•	•	•	•
Sumitomo/Hansen HP1	•	•	•	•	
Sumitomo/Hansen HP2	•	•	•	•	
Sumitomo/Hansen HPP	•	•	•	•	
Sumitomo/Hansen M4ACC	•	•	•	•	
Sumitomo/Hansen M5CT	•	•	•	•	
Sumitomo/Hansen P4	•	•	•	•	
Sumitomo/Hansen Paramax®	•	•	•	•	
ZF Industrieantriebe Witten ZN-WN-145	•	•	•	•	
ZF TE-ML	27D	27F	27H	27J	

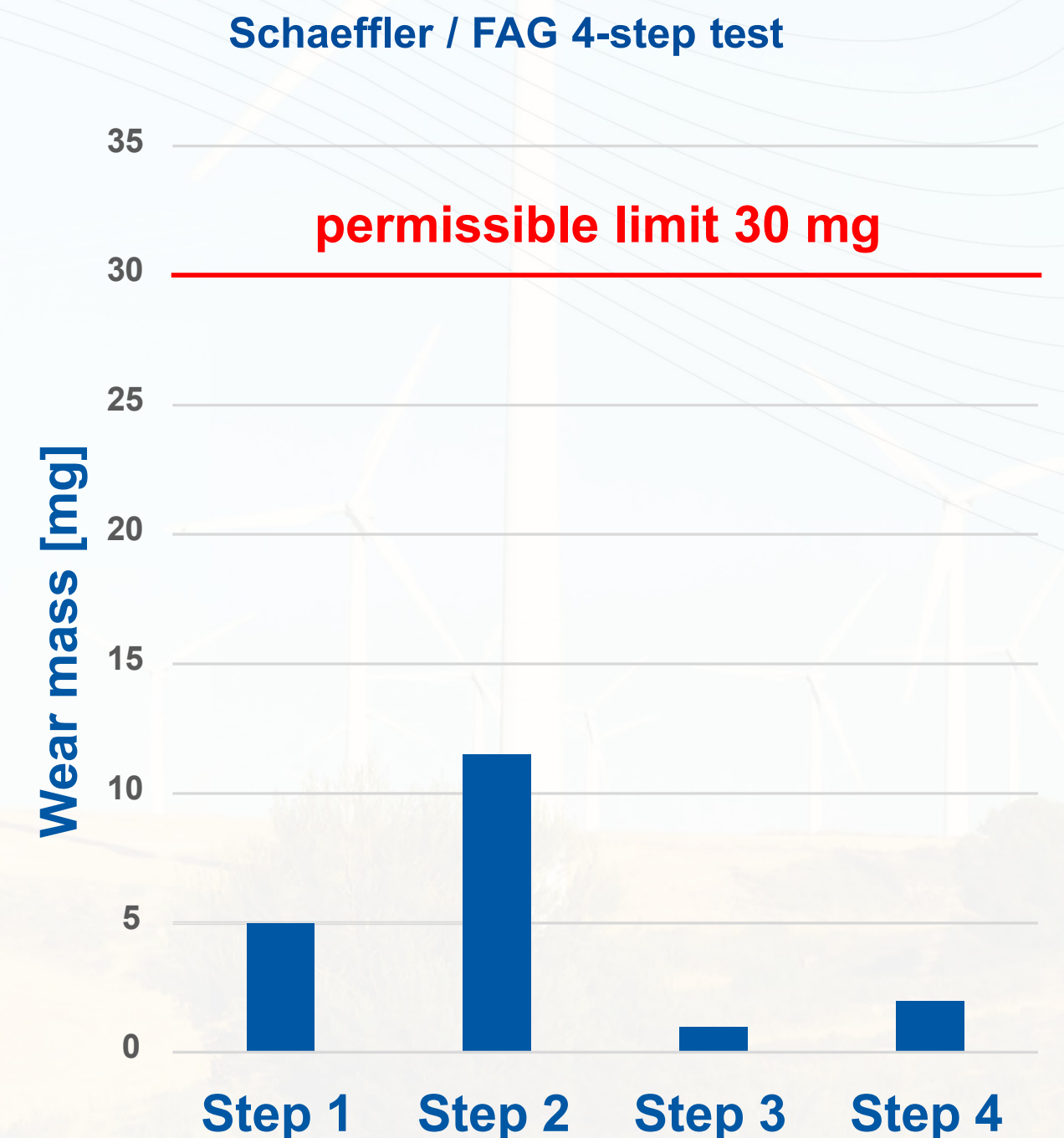
RAVENOL SWT | BEARING PROTECTION

RAVENOL SWT provides advanced bearing protection

Passes a wide range of demanding tests, far beyond typical gearbox operating conditions



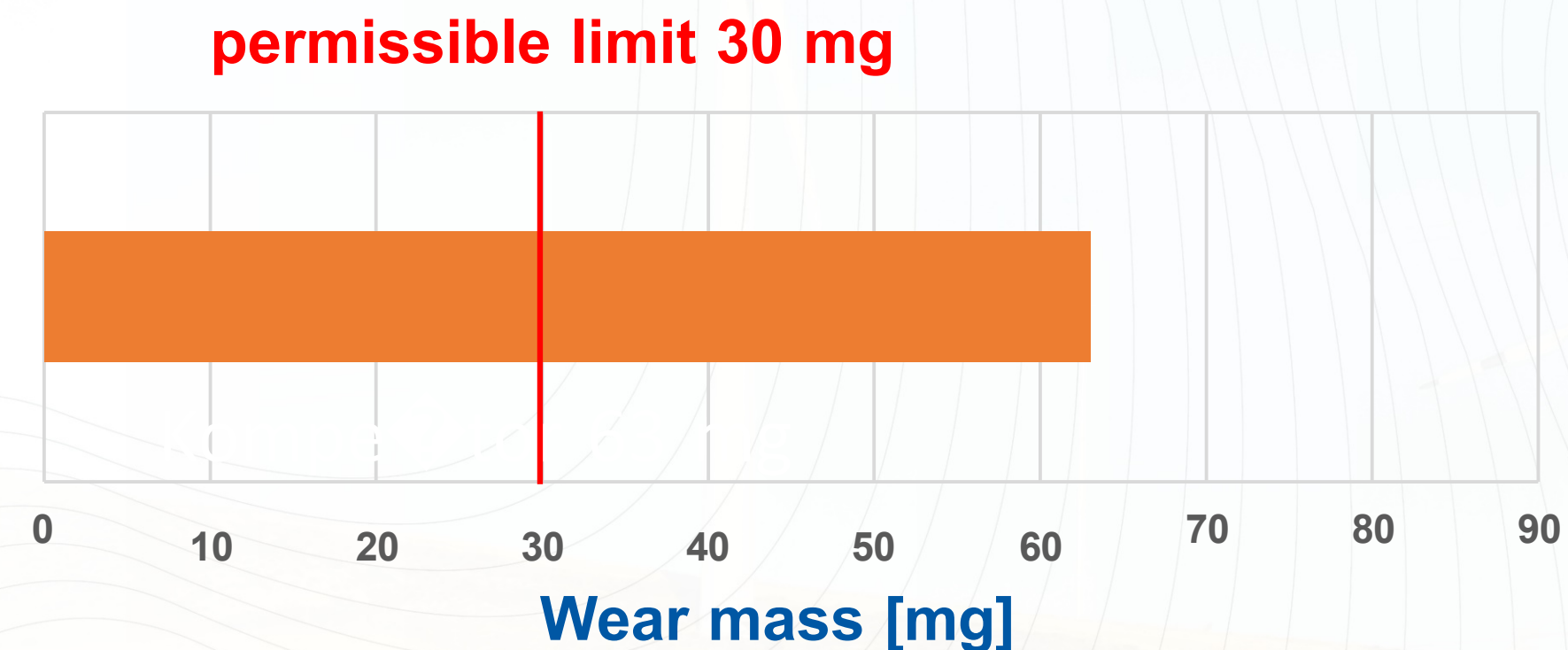
No WEC (White Etching Cracks)
Damages after 1750h -> no WEC
propagation with SWT!



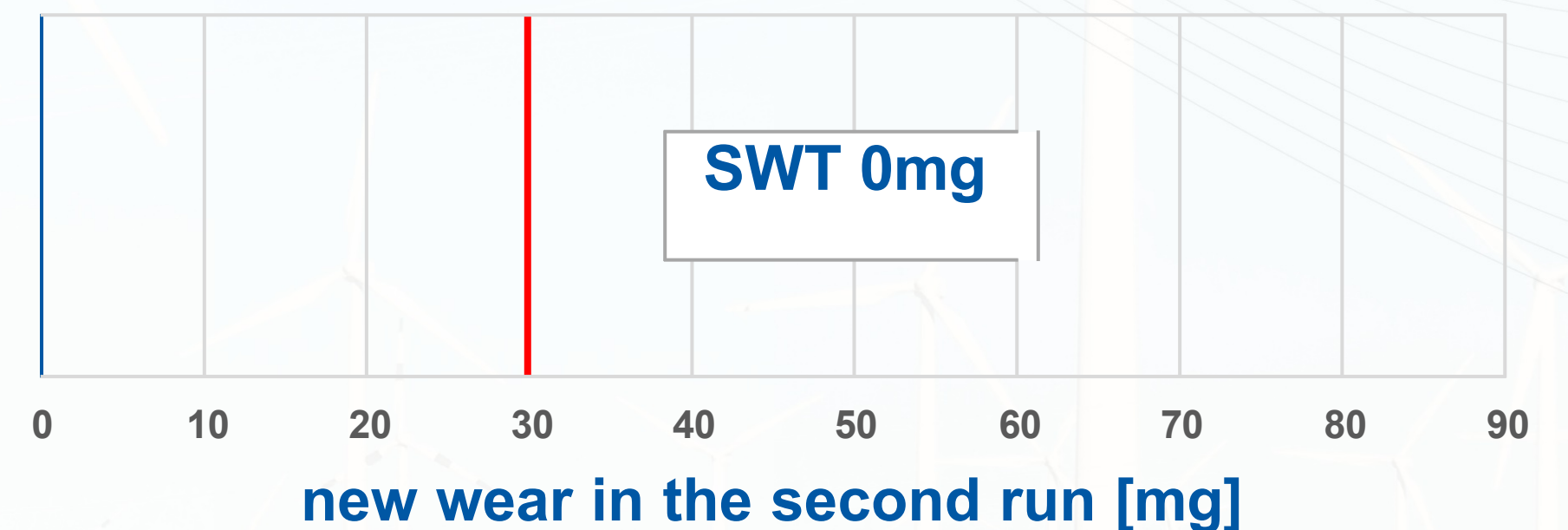
RAVENOL SWT | BEARING PROTECTION

RAVENOL SWT stabilizes the wear rates of rolling bearings

Test according to DIN 5119-3 m_{w50} (80h) on the FE8 test rig with a **competitor lubricant**



Replacement of the lubricant with RAVENOL SWT and repeat of the test (80h) with the used rolling bearings



Wear-related gearbox problems can be completely stopped by using RAVENOL SWT; excessive wear rates are stabilized

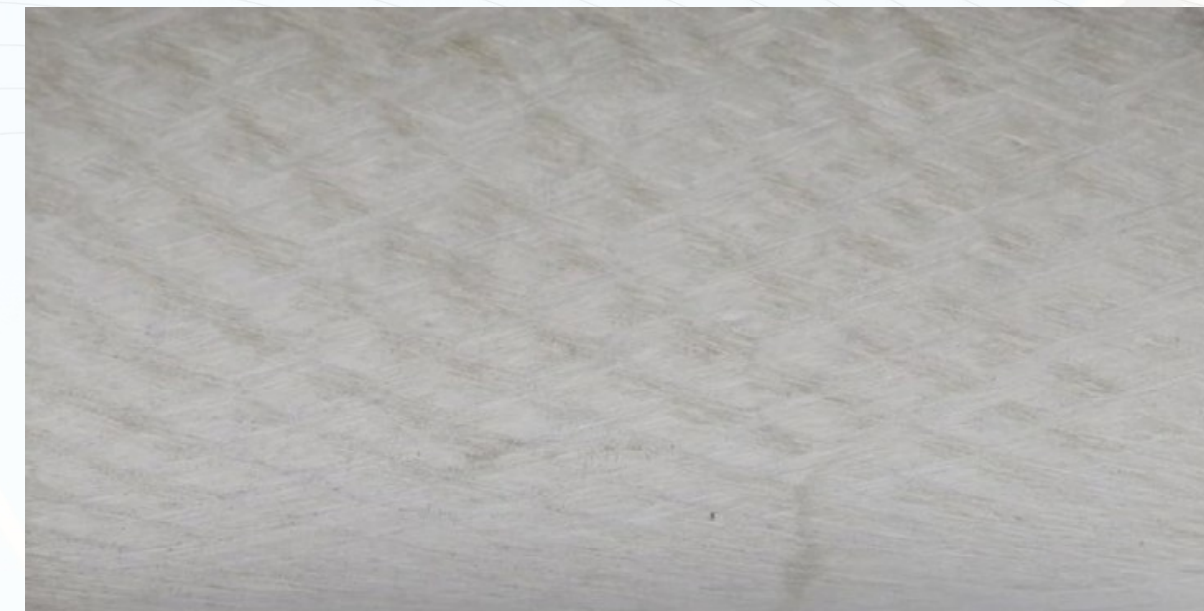
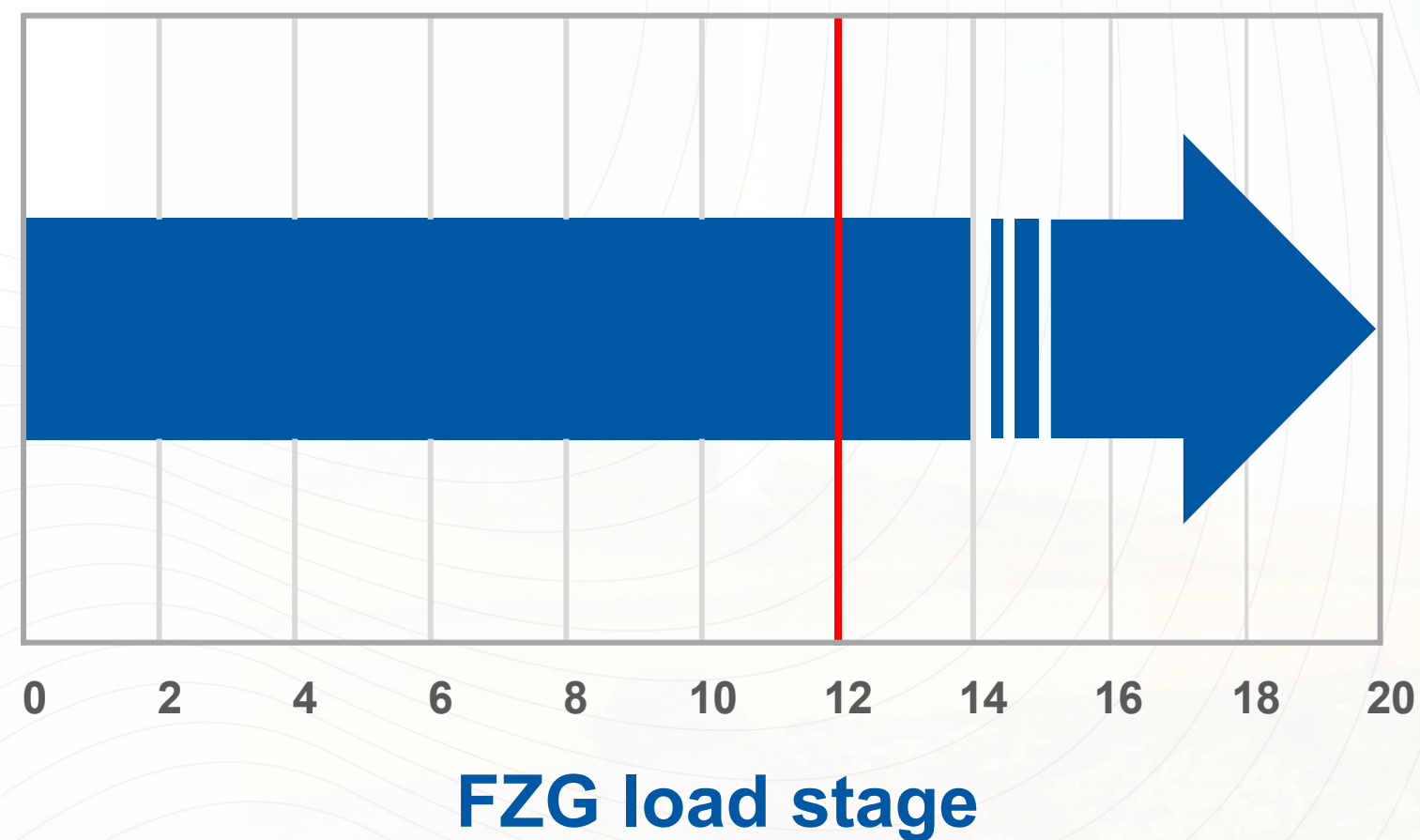
RAVENOL SWT | GEAR PROTECTION

RAVENOL SWT provides outstanding protection for gear teeth

FZG A/16.6/90 test with RAVENOL SWT

The highest measurable load stage (14) was passed without any signs of wear

permissible limit at load stage 12



Initial condition



After test completion – like new

RAVENOL SWT | GEAR PROTECTION

RAVENOL SWT protects gear teeth in all operating conditions

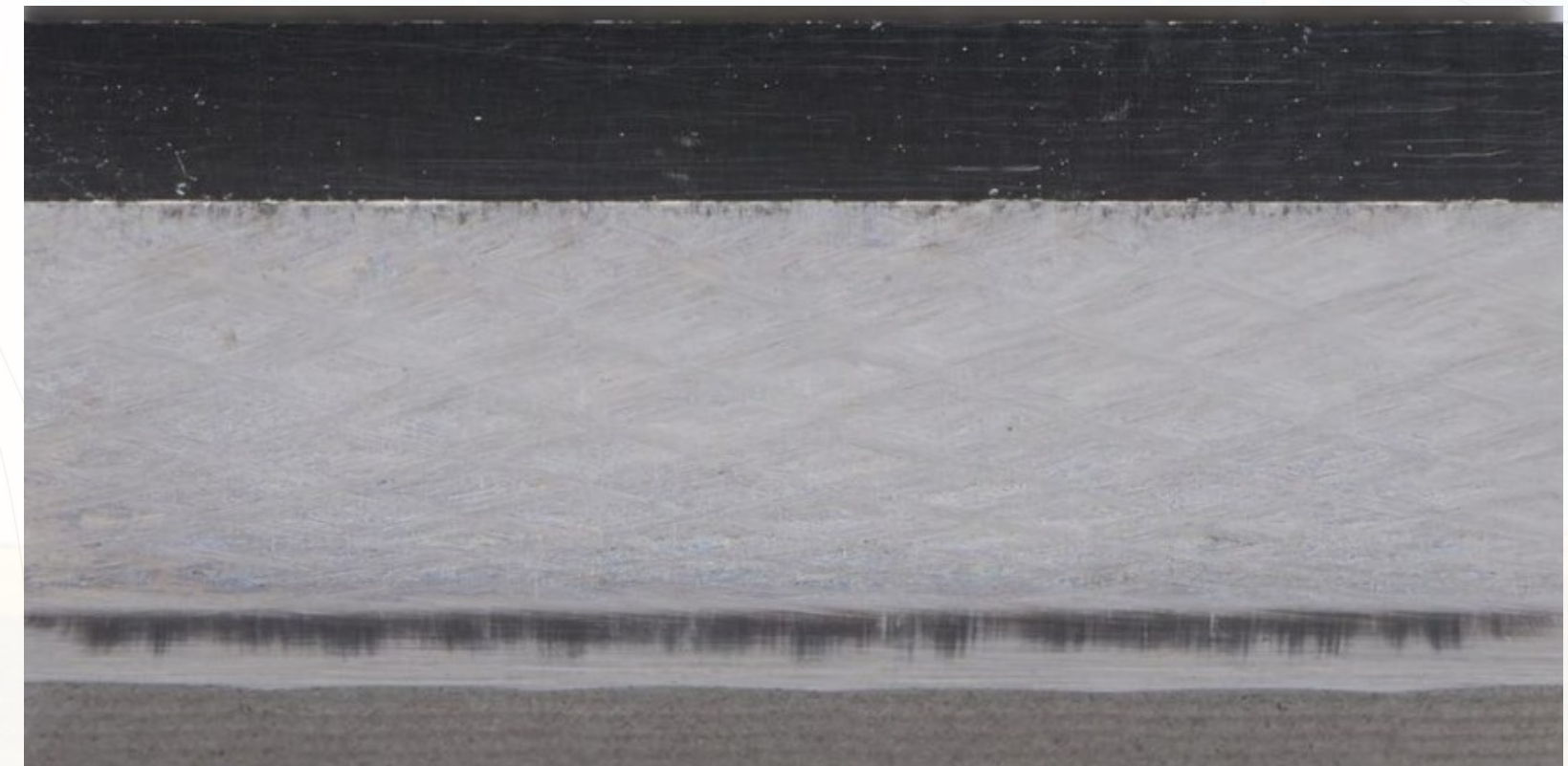
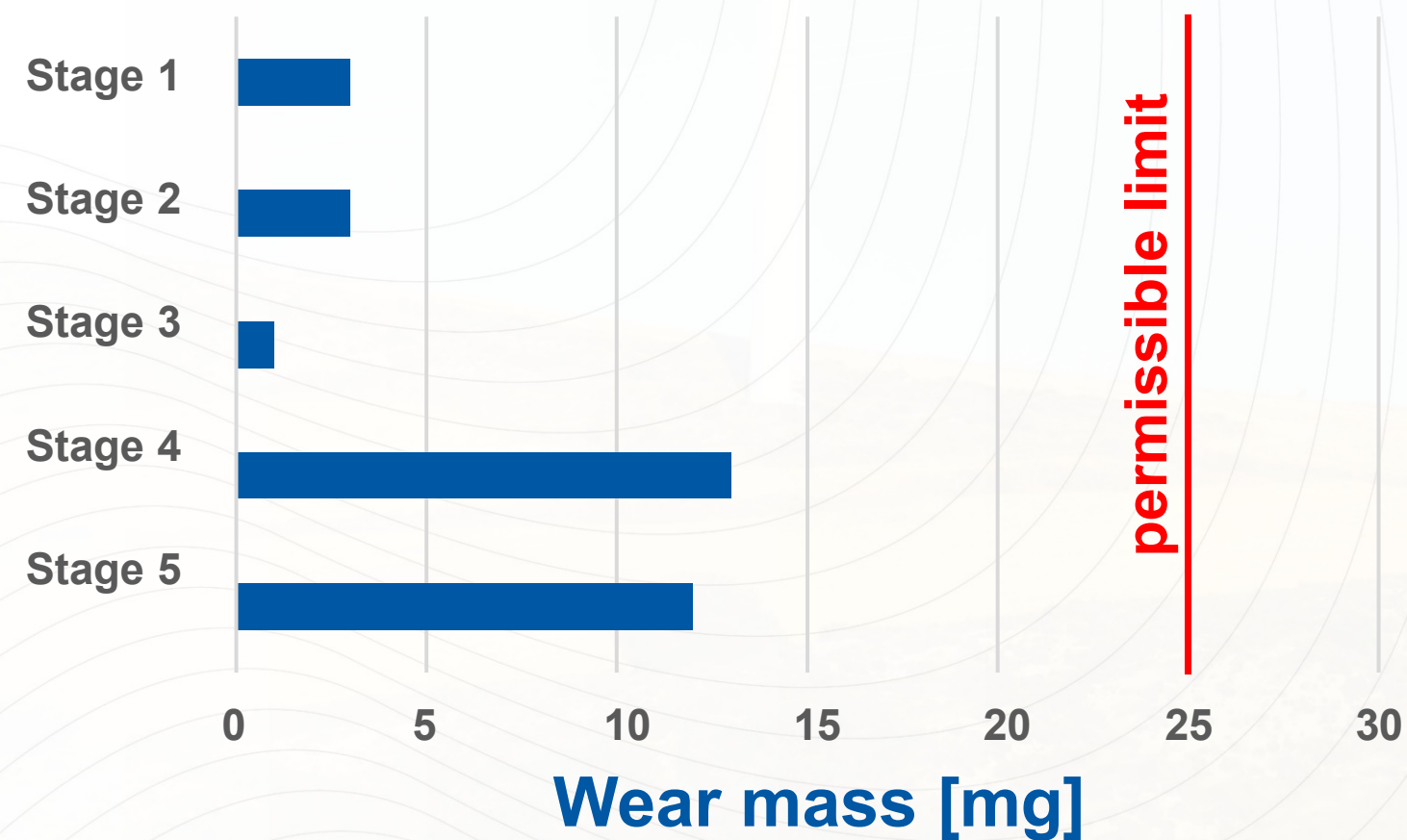
Very good performance at low speeds

- Low rotational speed at high torque
- Very low wear mass

Excellent protection against shock and impact loads

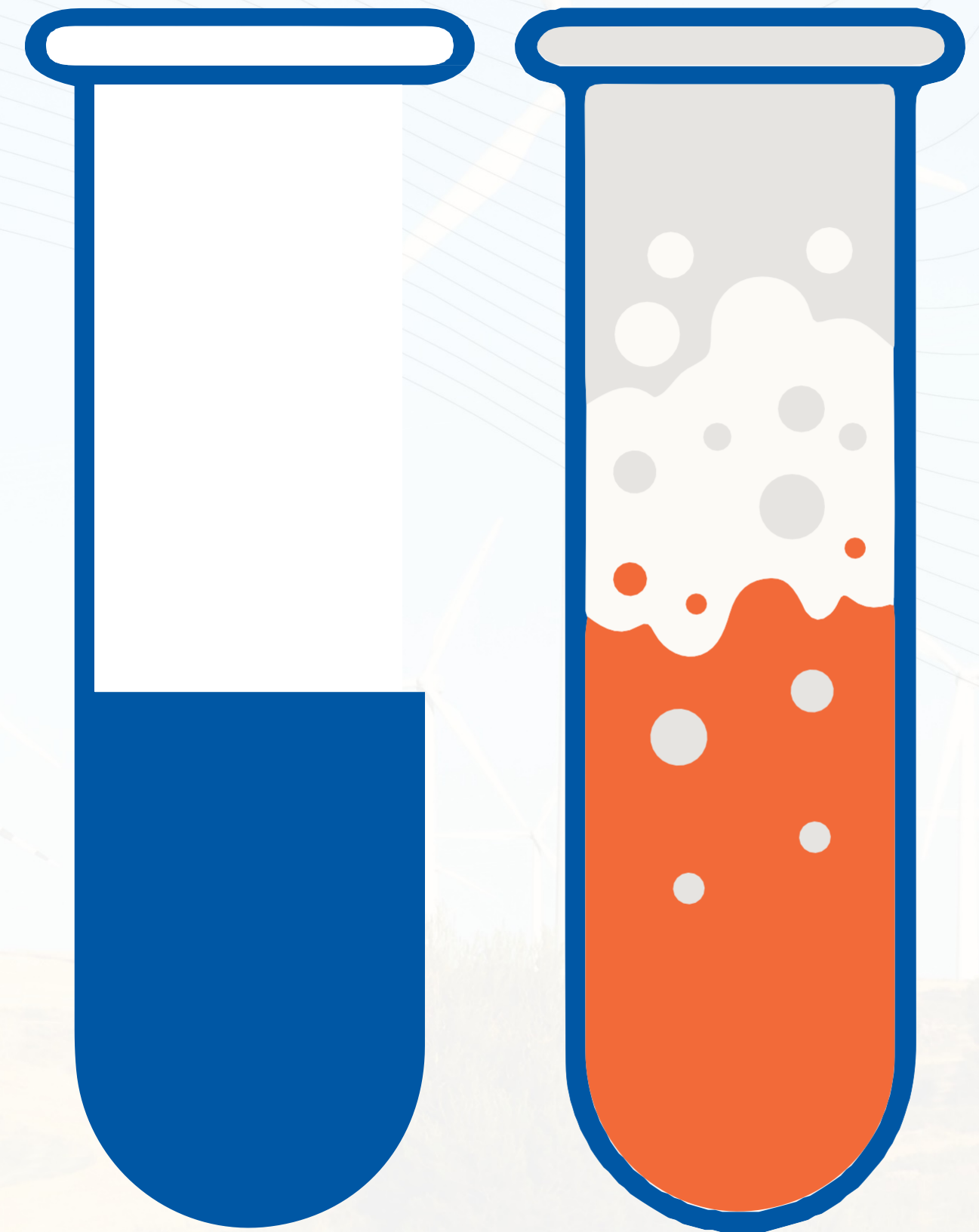
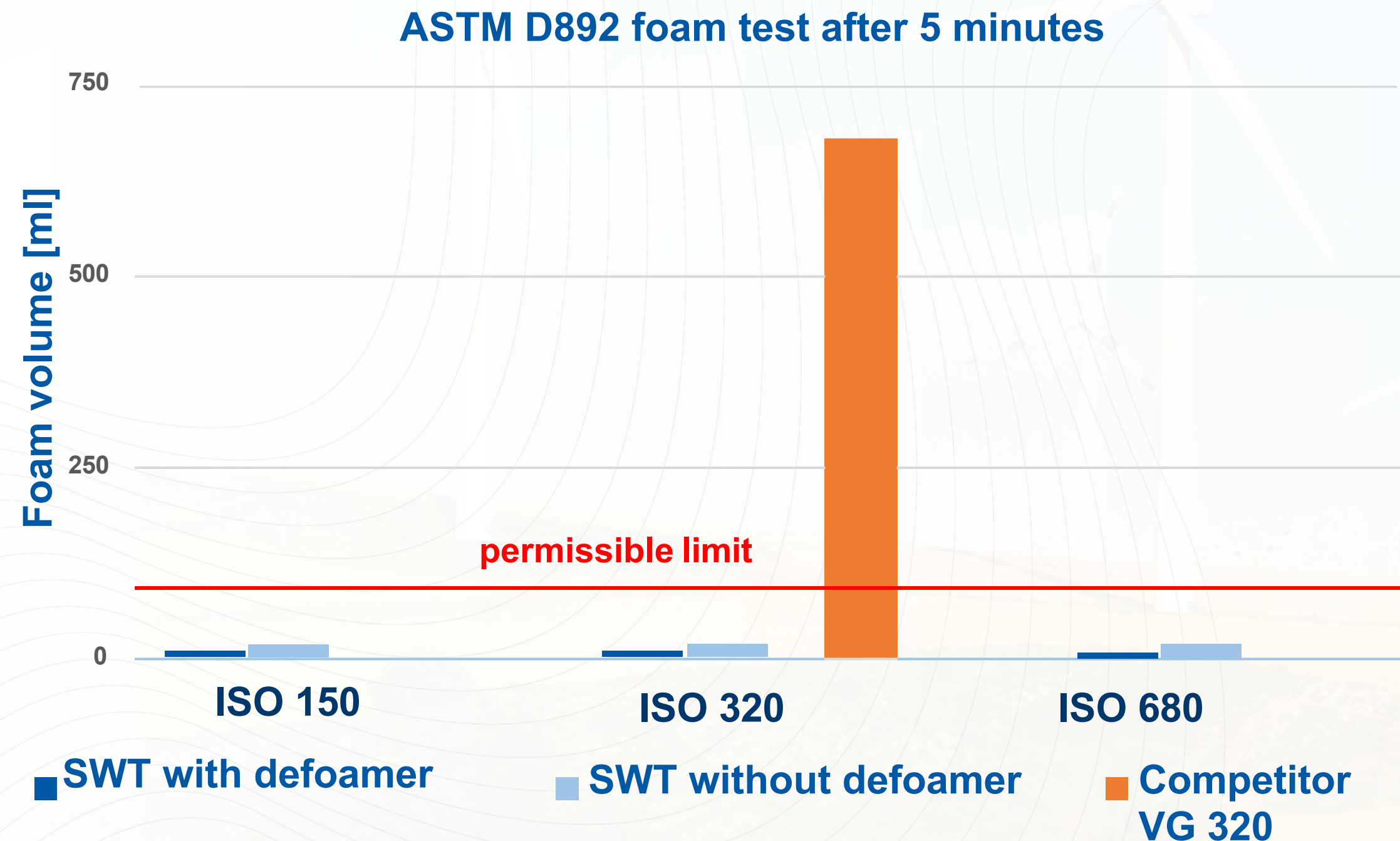
- Maximum loading of the test gearbox
- No time for the test gear teeth to run-in
- The maximum load stage 12 was exceeded

FZG Test C/0.05/90/12



RAVENOL SWT | FOAMING BEHAVIOR

The formulation of RAVENOL SWT impresses with its very low foaming tendency

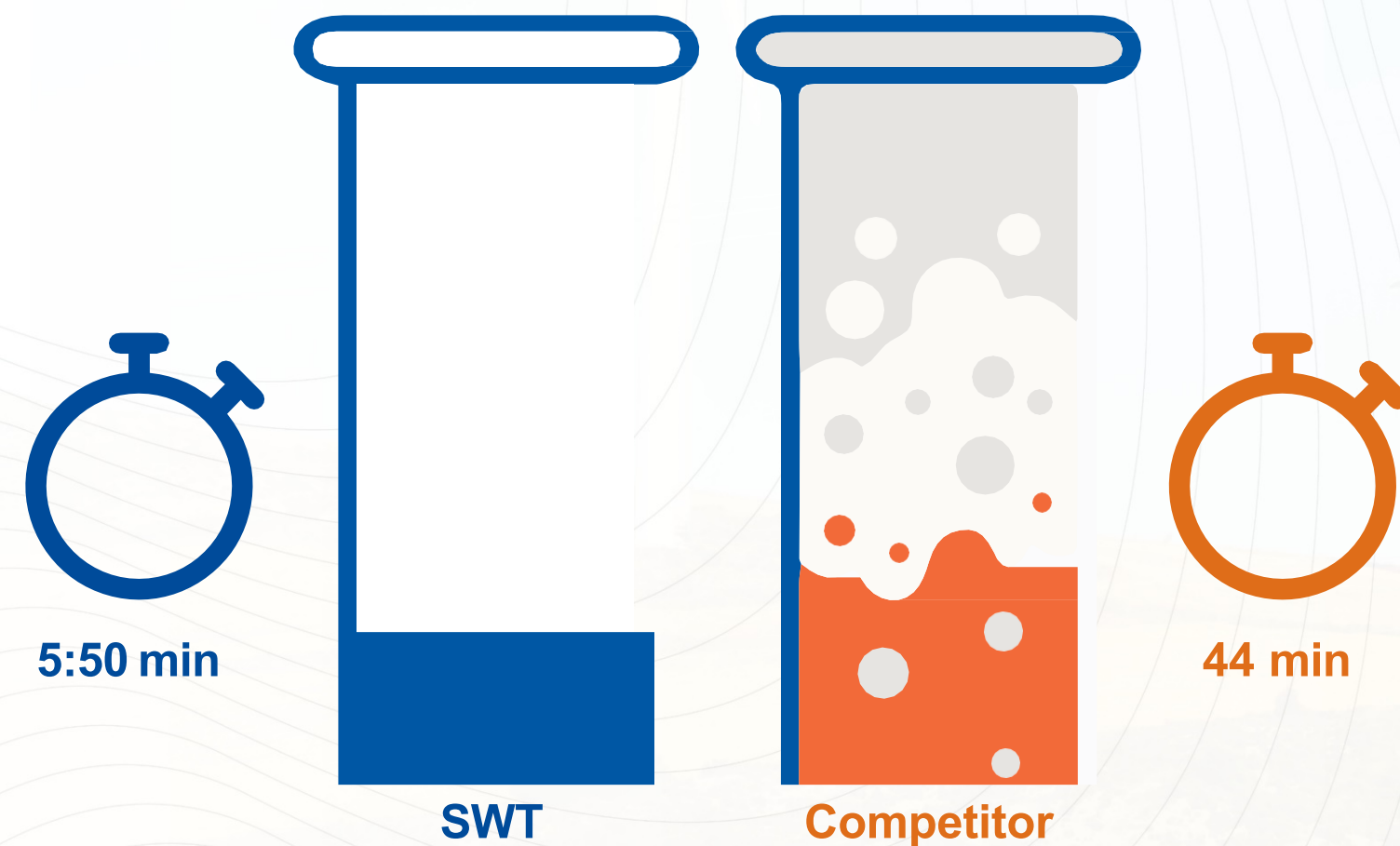


RAVENOL SWT | FOAMING BEHAVIOR

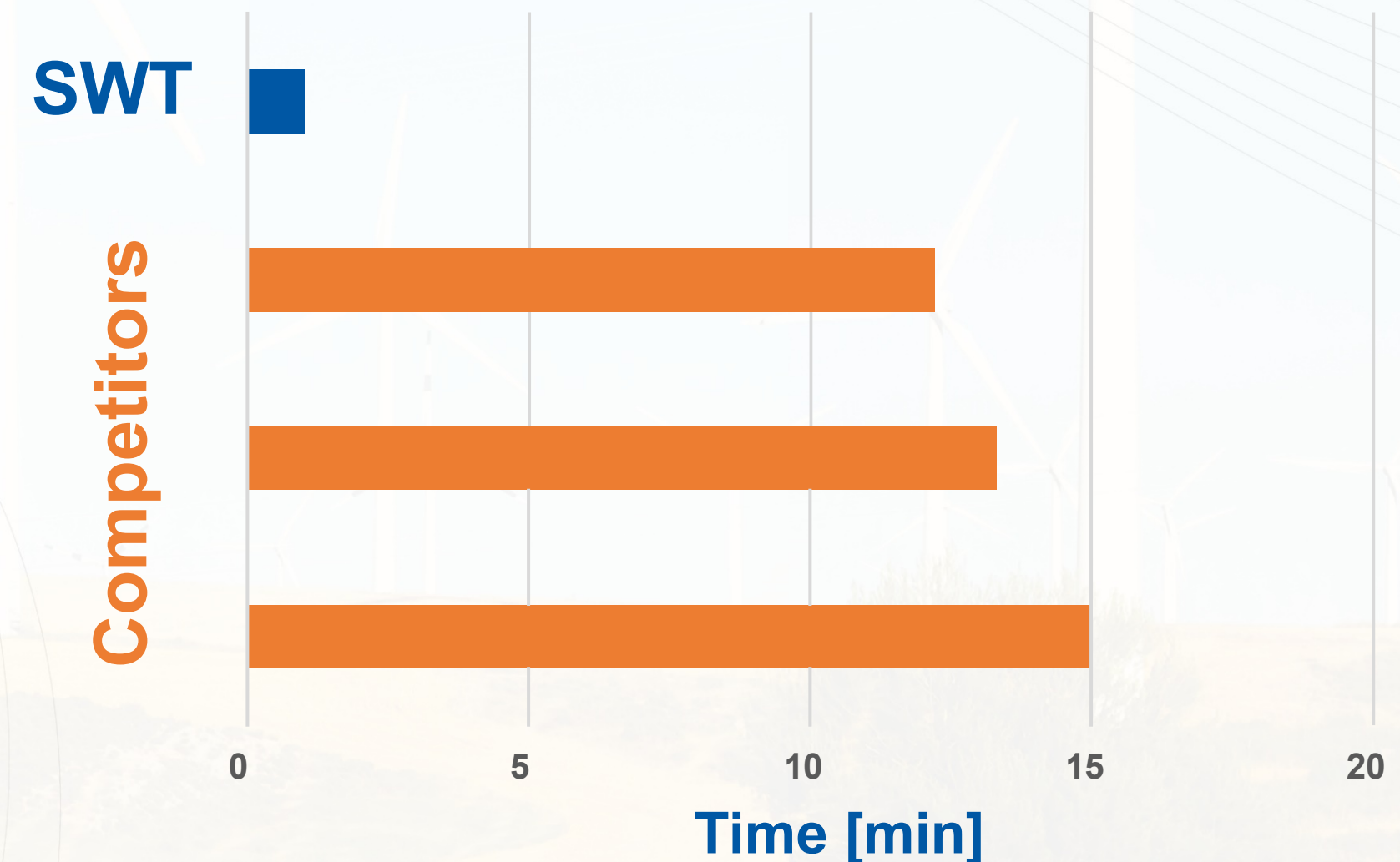
The formulation of RAVENOL SWT impresses with its very low foaming tendency

- Foaming behavior and air-release capability often represent an optimization challenge
- Despite its very **good foaming characteristics**, **SWT** is able to **release large amounts of air in a short time**

ASTM D3427 air release at 50°C (ISO 320)



ASTM D3427 air release at 75°C (ISO 320)

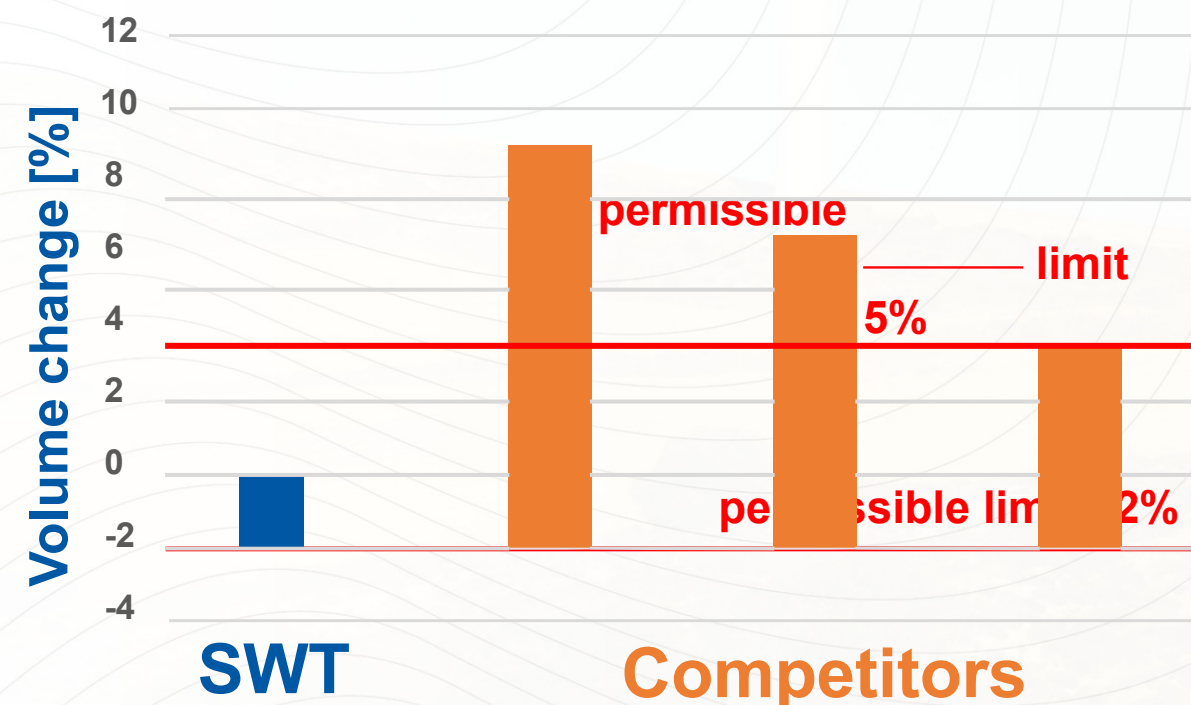


RAVENOL SWT | ELASTOMER COMPATIBILITY AND FILTERABILITY

SWT is characterized by its compatibility with static and dynamic seals

- **Protects** seals from common **failure mechanisms**
- Robust, passed NBR902, FKM585 & FKM260466
- Static and radial shaft-seal tests according to Flender test conditions
- Unlike many competitors, it does not cause excessive swelling of nitrile rubbers, which can be susceptible to it

NBR902 volume change



SWT demonstrates fine filtration properties

- **Longer oil change intervals** require **increased use of finer filtration** to ensure oil cleanliness and component protection.
- **Filter blockages** or the **removal of additives** can lead to **foaming, increased friction, and wear**.
- **Important filter designs** typically have **pore sizes of $\geq 3 \mu\text{m}$** to ensure a good balance between filtration efficiency and additive retention.
- Internal standards: Hydac and CC Jensen:
- **No loss of additive chemistry**
- **Passing of the Flender foam test** after filtration

