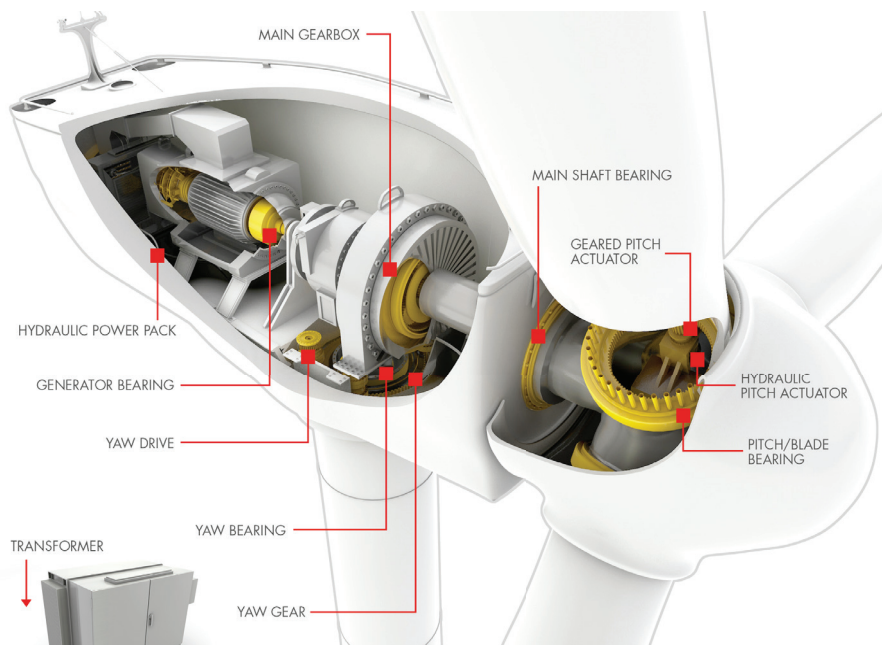




# HELPING OPTIMISE TURBINE EFFICIENCY AND REDUCE TOTAL COST OF OWNERSHIP

## SHELL OMALA S5 WIND

### MANAGING WIND TURBINE DOWNTIME IS A MAJOR INDUSTRY CHALLENGE



Damage to gears including micro-pitting is a top concern for wind farm managers<sup>1</sup>



Gearbox failures result in the highest amount (**21%**) of turbine downtime<sup>2</sup>



Of all wind turbine failures:

**67%**  
are bearing failures<sup>2</sup>

**25%**  
are from gears<sup>2</sup>

### FOR WIND TURBINE GEAR OILS, BALANCED PERFORMANCE IS CRITICAL

Suitability for wide range of operating temperatures



Protection for bearings even when contaminated with water



Foaming control, with rapid air release



Compatibility with seals and paints



Protection for gears



Long oil life in service



Cleanliness control and fine filterability



### SHELL OMALA S5 WIND 320 CAN HELP REDUCE DOWNTIME AND LOWER MAINTENANCE COSTS

- Protects the gearbox to help extend equipment life
- Faster start-up for better speed to grid
- Helps improve turbine availability
- Helps enable performance in extreme temperatures
- Helps maintain clean systems
- Longer oil drain intervals



### BEHIND SHELL OMALA S5 WIND 320

#### LONG OIL LIFE

- 2.5 times better oxidation stability than best-performing competitor<sup>3</sup>
- Helps limit gearbox sludge formation

#### STRONG WEAR AND CORROSION PROTECTION

- High scuffing resistance even at low speeds<sup>5</sup>
- High micropitting resistance
- Excellent resistance to corrosion even in salt water<sup>6</sup>

#### OUTSTANDING LOW TEMPERATURE CHARACTERISTICS

- Low pour point and excellent low temperature fluidity<sup>4</sup>
- Faster start up in cold climates
- Protects the gearbox in a range of temperatures

#### SUPERIOR FILTERABILITY\* AND STRONG FOAM PREVENTION

- Fast air release<sup>7</sup>
- Minimal foam even after 50,000 cycles<sup>8</sup>
- Low maintenance and operational costs

<sup>1</sup> Data from Shell Wind Webinars customer poll, June 2015. <sup>2</sup> National Renewable Energy Laboratory Gearbox Reliability Collaborative Failure Database. <sup>3</sup> ASTM D2893B (modified) – 48 days. <sup>4</sup> ASTM D2983 – Brookfield viscosity results. <sup>5</sup> FZG = Forschungsstelle für Zahnräder und Getriebebau, SO 14635-1 (DIN 51354-2). <sup>6</sup> SKF EMCOR test – ISO 11007  
\*Compared to competitor oils. <sup>7</sup> Air release test results, IP 313. <sup>8</sup> Hydac = filter manufacturer mullpass HIN 30-08.