Taking a gear oil performing on PAO-level and putting it into a common gearbox specified for mineral gear oil can be a brilliant idea. A thrilling comparison test took place at a sewage plant in South Africa: A high-performance gear oil formulated with NUFLUX™ technology vs. a conventional mineral gear oil, both working back to back in the same type of a 3-stage gearbox.

NUFLUX™ is an innovative technology developed by Evonik, a major German specialty chemicals company. Evonik enables lubricant companies to formulate industrial gear oils which not only deliver benefits such as long service life and lower operating temperature, but also are cost efficient.
EXCELLENT TESTING CONDITIONS

Sebokeng Water Care Works has 27 gear driven paddle aerators. Gearboxes have been operational for just two months, the load was fairly constant, the atmosphere was clean and exposure to dust and water were minimal. The gearbox manufacturer has specified the use of EP ISO VG 220 industrial gear oil.

THE TEST PROCEDURE

Bearing Man Group (BMG), a leading gearbox supplier, service and repair provider in South Africa, installed condition monitoring equipment, power analyzer and a data logger. A strain gauge was supplied, installed and calibrated by Estlec CC. Both oils were run back to back with extensive flushing between the oil-change. The motor power was recorded every five minutes. The strain gauge provided an indication of power losses in the gearbox, and a transmitting device attached to the output shaft recorded the speed of the output shaft driving the agitators. Temperature sensors recorded oil sump temperature and ambient temperature.

From the synchronized data acquired and recorded by the data logger and strain gauge at the same time, approximately 3,500 data points were captured per oil, a good number for statistical evaluation.

THE RESULT: 2.9% MORE EFFICIENCY

Oil formulated with NUFLUX™ technology (ISO VG 220) improved the gearbox efficiency by 2.9% relative to the mineral oil ISO VG 220.

TEMPERATURE SENSOR ANALYTICS

Sensors show that NUFLUX™ VG 220 gearbox oil runs approx. 1°C cooler compared to mineral oil VG 220. This has advantages in oil aging. Evonik experts attribute the energy savings offered by oil formulated with NUFLUX™ technology over mineral oil to the lower friction within the bulk of NUFLUX™ VG 220. This is due to the choice of base oil mixture, comprising of VISCOBASE® 5-220 and NEXBASE™ 3080.

“Electricity is SWCW’s highest single expense. So, if you calculate savings to a monthly total, we could save R272,000. This is why we are considering to use NUFLUX™ in all of our aerator gearboxes.”

George Drewing, Plant Superintendant at Sebokeng Water Care Works (SWCW)

“What happened at Sebokeng Water Care Works was an undoubted 2.9% efficiency gain caused by the NUFLUX™ formulated gear oil compared to a mineral oil. ... Amidst the results, we consider this technology proven within the test parameters, BMG would also consider this to be a product of interest to our customers in line with our drives to supply efficient cost saving products and services.”

Gareth Evans, Bearing Man Group, BMG