



## TACBECON SYN GEAR 930 GEAR DRIVE LUBRICANT

Maximise The Life Expectancy of  
Cooling Tower Gear Drives



### TACBECON SYN GEAR 930

*A lubricating gear oil formulated for cooling tower gear drives in iron and steel industries*

The cooling tower is crucial in iron and steel production. The reduction gear drive that operates in the cooling tower is subjected to a variety of environmental and operational challenges, including high operating temperature and load.

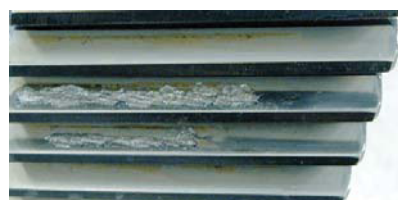
The gear drive located central to the tower directly under a large fan requires a reliable long-term lubrication solution; a simple lubrication maintenance cannot be easily conducted while fan is still operating.

#### Synthetic Gear Drive Oils For Better Gear Drive Life Expectancy in Cooling Tower

High operating temperature in cooling tower reduction gear drives are often caused by plant operations, environmental conditions and meshing of gear teeth. With these factors combined, the temperature in enclosed gearboxes may escalate up to 95°C.

Mineral-based oils are not preferable because the oxidation and degradation rates accelerate when the temperature is operating above 70°C. Consequently, by products such as sludge, carbonised deposits and varnish will be formed and accumulation will cause premature gear failures.

Synthetic gear drive oils offer several key advantages over typical refined mineral oil products, whether they are extreme pressure (EP) formulated or oxidation inhibiting. Synthetic gear oils are synthesized compounds that are



Cooling tower gear failure resulted from inadequate gear lubrication

extremely difficult to breakdown due to their strong chemical bonds.

Synthetic gear oil as a class don't show their age particularly at high temperatures and have a longer service life. Often, the change interval is several times longer for synthetics at identical operating temperatures. However, the exact number depends on operating conditions, the additives and the specific synthetic used.

Synthetic gear oils have a lower coefficient of friction, better film strength and a better relationship between viscosity and temperature (viscosity index, VI). This indicates synthetic gear oils are very stable and consistent in performance at different temperatures. Synthetics prolong service lifespan significantly when compared to minerals (see table 1).

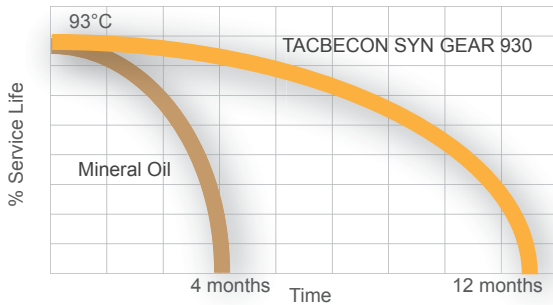
Parameter	Mineral Oil	Synthetic Oil
Oxidation and thermal stability	Poor	Excellent
Extreme pressure performance	Fair	Excellent
Energy consumption	High	Low
Deposit formation	High	Low

Table 1. Synthetic over mineral oil

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Oil drain intervals can be extended significantly when synthetic-based oil are used due to the excellent thermal-oxidative stability. The lack of sludge and abrasive deposit formation also lead to improved gear box cleanliness, prevented premature failures and extended lifespan of component.

Synthetics have high initial costs, but change-out intervals are compensated as compared to minerals that have 3 - 5 times more change-out intervals.



Graph 2. Oil Change Interval at Service Temperature of 93°C

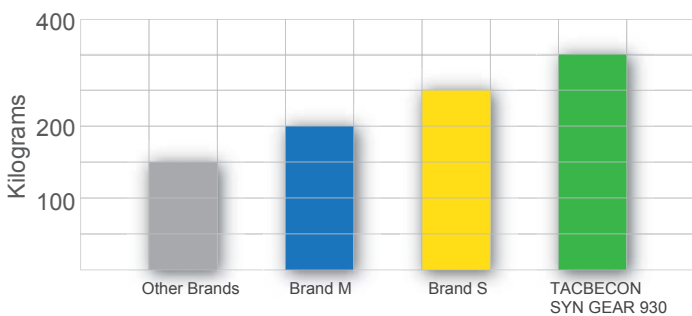
Synthetic gear oils are clearly superior in the extreme zone where temperatures, high loads or flammability are overriding factors. They also perform well in cooling tower gear drive where needs are specific and complex.

Most of the synthetic gear oils are engineered to meet targeted performance benchmarks, and a synthetic gear oil formula can be (and probably has been) engineered for almost every combination of properties used in industry.

**Product Recommendation**

TACBECON SYN GEAR 930 fully synthetic gear oils are recommended for cooling tower gear drives, offering excellent gear protection, cleaner and extended drain intervals. These lubricants are formulated with synthesised hydrocarbon base oil coupled with an extremely stable additive package that make them ideal for gear drives.

The superior load-carrying capacity of TACBECON SYN GEAR 930 compared to other brands, means the gear drive oil can withstand high mechanical vibration and sliding loads (see graph 3 and image 4).



Graph 3. Four Ball Weld Load Result Comparison

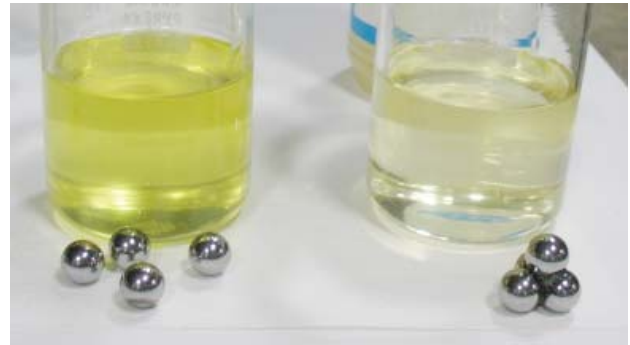
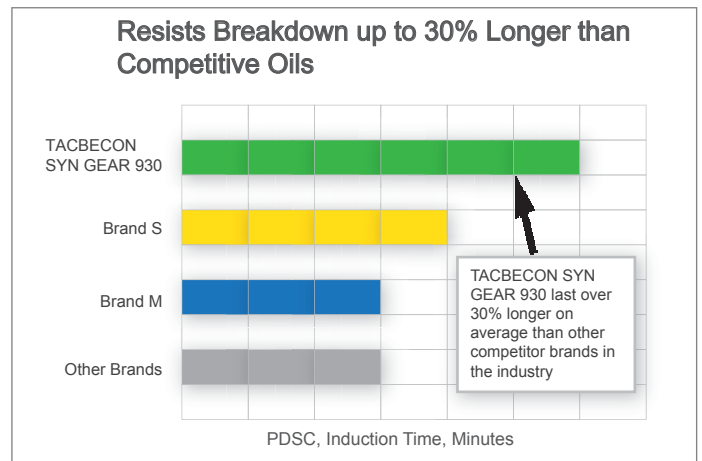


Image 4. TACBECON SYN GEAR 930 has proven superior than competitor brand as the four ball did not weld during the four-ball weld test at 315 kg.

TACBECON SYN GEAR 930 stands out for its excellent ageing and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability as compared to most of the brands. (see graph 5)



Graph 5. PDSC Oxidative Test

At high operating temperature, TACBECON SYN GEAR 930 will break down periodically and cleanly leave no abrasive deposits that accelerate gear drive failures (see image 6).



Image 6. Comparison of Deposits Formation after Complete Decomposition at High Temperatures.

TACBECON SYN GEAR 930 is highly recommended for cooling tower enclosed gearboxes, especially those in iron and steel plant operating constantly at high temperature and exposing to heavy loads.

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