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Press Release

TBN data an important condition monitoring tool

Total Base Number (TBN) is an important indicator used by Techenomics in its condition-based monitoring service which measures the status of an asset while it is operating. The higher the TBN, the more acid that can be neutralised by the oil and the more effectively the equipment will operate.

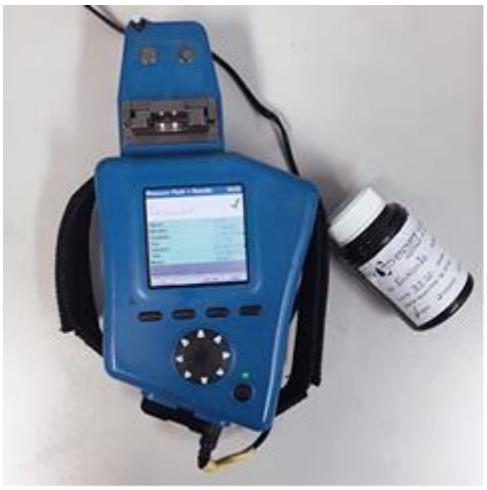
Chris Adsett, CEO of Techenomics International

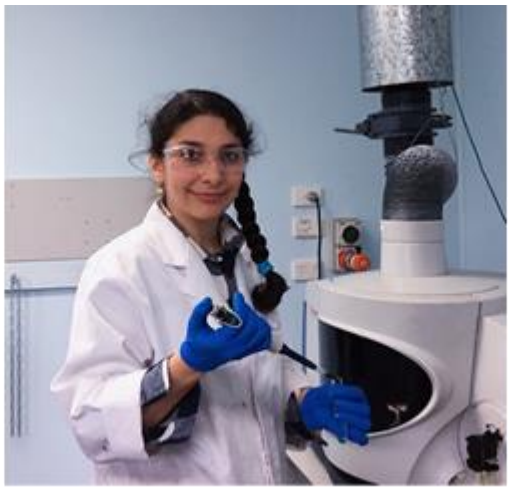
Condition-based monitoring helps ensure equipment has higher reliability and availability as it reduces failure rates and prevents overuse of spares.

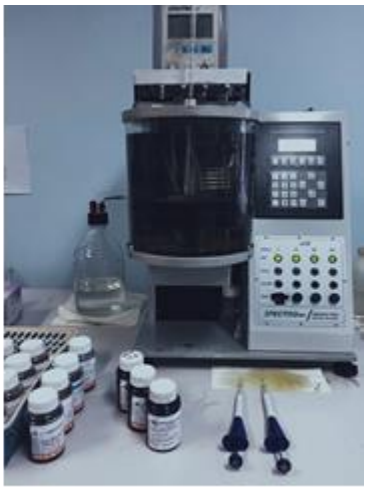
Techenomics CEO Chris Adsett says TBN is often used to describe the quality of oil and helps monitor the remaining life of used oil. "TBN data, therefore, indicates whether the oil is performing as it should and, when trended, can reveal the amount of engine wear.

"Measures can then be taken by the equipment owner to ensure the reasons for the TBN reading are addressed before costly maintenance downtime and loss of production."

He says operators need to keep a close watch on TBN levels, among other performance measures. "New engine oils typically possess TBNs from around 5.0 to 17 for petrol and diesel engines, depending on manufacturer and intended service, and in some cases higher for specific ship engine oil.
"To estimate the useful lifetime of oil it is necessary to track the rate of the drop in TBN which is determined by the amount of acids introduced to the system over time. The acids are a by-product of combustion, chemical reactions and oil degradation," he says.







Techenomics Australia laboratory supervisor Sahar Nazari

Techenomics Australia laboratory supervisor Sahar Nazari says probable causes for a reduction in TBN are contamination with water or additive depletion; over usage or extended oil drain interval without regular replenishment; oxidation of lubricant due to engine overheating; and the use of low-quality, high sulphur fuel.

“During combustion, a low-quality fuel with high sulphur content can produce sulphuric acid, which attacks the oil and causes a drop in the base number. In addition, fuel could be entering the crankcase and causing dilution, so the rate of TBN decay will increase.”

She says reasons for an increase in TBN are changing or replenishing the engine oil, stuffing box leaks or contamination with high TBN cylinder oil, for example in motor ship crosshead diesels or steam engines. “This trend can be confirmed by an increase in composition values of metal additives. It is also accompanied by an increase in viscosity, which has many disadvantages, including but not limited to, increased fuel consumption and heat generation.”

Engine builders have various TBN limits for establishing drain intervals and condemning used oil, Sahar Nazari says. Among these guidelines are a reduction in TBN to one-third of the initial value while others require fresh lubricants with a minimum TBN of at least 20 times the fuel sulphur level for pre-chamber engines and 10 times for direct injection engines, and, furthermore, suggest a condemning limit of half that amount.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“Some detergents do not effectively neutralise all acidic species present in the lubricant, thereby reserving their own base (TBNs were at an acceptable level), while in fact the oil may no longer provide sufficient protection against bearing corrosion.

“Each detergent type has strengths and weaknesses. Some detergents with good TBN retention are less effective in neutralising acids and may cause lubricants to be less oxidative stable.

“It is not possible to properly characterise a lubricant and judge its suitability for extended service intervals on the basis of TBN retention alone. Other indicators, such as Total Acid Number (TAN) and oxidation also need to be evaluated because of the potential impact on bearing corrosion,” she adds.

Chris Adsett says it is important to carry out regular tests to check for TBN owing to the many variables which can lead to acid build-up.

“These days other parameters are important to maintain engine durability and extended service protection, such as oxidation stability, wear control and effective soot dispersal.
“A balanced oil has multiple performance abilities and TBN is just one of the performance measures important in today’s high-performance engine oils.”

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