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FROM:

LEWIS FOX
DIRECTOR OF TECHNOLOGY

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UPDATE ON TAN VS. TBN

The introduction of Mack Engine Manufacturer's EO-N Premium Plus engine oil specification, with its slightly higher TBN requirement, has brought recent inquiries concerning the difference between reporting total acid number (TAN) versus total base number (TBN) on SWEPCO's laboratory oil analysis (LOA) reports. To further explore this, a better understanding of these two terms is necessary.

TBN (Total Base Number): Is a measurement of the reserve alkalinity remaining in engine lubricants and is indicative of the oil's ability to counteract acid formation. Decrease in TBN affects the ability of the lubricant to protect against corrosion of such engine parts as rings and cylinder liners. A low TBN usually means a low dispersion characteristic and a depleted additive package.

The TBN additives (detergents and dispersants) will neutralize acidic combustion products and deposit forming compounds within the oil, as well as hold them in suspension, thus preventing deposition on metal surfaces. When you see the pictures of a nice clean piston as a part of the "before and after" pictures of a lubricant trial test, this is a direct benefit of these TBN additives.

TAN (Total Acid Number): Represents all the acidic constituents in a lubricant, including those from certain additives, combustion blow-by and oxy-materials due to time and/or operating temperature. It indicates acidic contamination of the oil or increased oil oxidation, both of which raise the potential for corrosive wear.

High TAN will cause:

- The formation of gums and lacquers on metal surfaces.
- Increased viscosity.
- System corrosion, particularly if water is present.

Because the chemistries used to make up TBN can differ in quality and ability to maintain effectiveness over extended drain intervals, the TAN test and results is the most accurate measure of the oils on-going ability to resist degradation from greater level of acidity. This definitely makes the TAN test the preferred test method for used oil analysis...especially in determining the extended drain capabilities for a wide variety of oils.



... to keep it running

With TBN, industry standards will generally recommend a drain when the TBN has been used up...generally about ½ of its original number. For TAN, as the acid level increases to about double the oil's original TAN, generally a drain will be called for. The original TAN level varies from type of product (i.e. hydraulic oil, transmission fluid, engine oil, etc.) as well as varying from manufacturer to manufacturer. For engine oils, an upper limit of 5.0 is often used as a condemnation limit.

On a global scale, industry standards have determined an oil with a TBN of 10 is generally all that is necessary to meet the various API and engine manufacturer's specifications. In a few countries, where sulfur content in the fuel may be extremely high, or as in the case of Mack's EO-N Premium Plus specification, a TBN of 11 may be suggested. In these isolated incidents, it is important to keep in mind that an extraordinary high TBN rating of one oil over another is not always an advantage. A key factor is not necessarily how high the TBN rating is, but what is the quality and retention capabilities of its chemistry...especially over extended drain interval periods. Field experience has shown that SWEPCO engine oil's TBN of 10 has proven to provide much longer drain interval capabilities and superior protection over conventional oils carrying a TBN of 11 or higher.