

Lubrication Checkup

Written by Dr. Lube, AKA Ken Bannister
Friday, 12 February 2010 13:51



Alarm Limits For TAN

Symptom:

"What's the best way to set alarm limits for TAN in lube oil analysis? Also, if a TAN alarm is exceeded, how fast do we need to react, and is there a difference between conventional and synthetic TAN limits?"

Diagnosis:

TAN (Total Acid Number) defines the amount of acid and acid-like materials present in oil. Measured in milligrams of potassium hydroxide per gram, 1 mg KOH/g is the equivalent of one acid number. Depending on an oil's use, acidic components caused by water, rust, corrosion and oxidation accumulate over time, causing acidity and its corresponding TAN # to increase. Unattended, these acids will continue to deplete oil additives, corrode surfaces, reduce pumpability and deposit themselves as lacquers on hot surfaces.

Critical TAN numbers are dependant on the oil type. Typically, light duty industrial and R & O (rust and oxidation inhibited) oils have a maximum TAN # of 2. Antiwear and EP (extreme pressure) oils have allowable maximum levels up to 4 before they must be changed. While the thermal- and oxidation-stability and natural detergency of synthetics give them an advantage over conventional lubricants, their TAN # limits will still vary depending on the type of synthetic.

Prescription:

A single test rarely gives us the picture we are looking for; such is the case with TAN testing. An oil's acidity level will decrease initially, then eventually rise as the oil ages and additives deplete, requiring us to trend monitor the TAN # over time and in numerous samples. We must also read the TAN # in conjunction with other results. For example, an increase in acidity will manifest as an increase in viscosity. A rapid rise in the number also could indicate a rise in the oil's water content. Conversely, depletion of rust inhibitor, detergent and antiwear additives will increase the TAN #. In combustion-engine oil, the combination of a rise in TAN # and a fall in TBN # (Total Base Number or alkalinity level) is used to determine an oil-change condition.

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Oil type, ambient conditions and oil-use factors all combine to dictate the required oil analysis test(s) and setting of critical TAN # limits. This information is best obtained by working with a single lab that will perform the same test consistently over the oil's life span and assist the user in determining the correct limits for the application. Once a pre-determined alarm or critical state is recognized, action must be taken ASAP (within 24-48 hrs).

Lubrication questions? E-mail: doctorlube@atpnetwork.com (Dr. Lube, aka Ken Bannister, will be a featured part of MARTS 2010. To register for and/or learn more about his value-added pre-conference workshop "Liquid Gold: Implementing a Winning Lube Strategy for Maximum Gain," visit www.MARTSconference.com)

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