



Klarwin Automotive & Industrial Technology

CASE STUDY

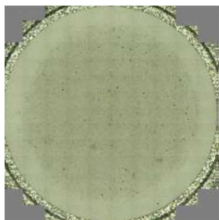
INCREASING CALIBRATION FLUID LIFE THROUGH FILTRATION & PURIFICATION



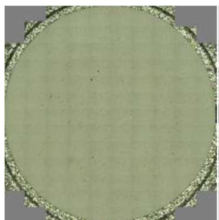
(1)



(2)



(3)



(4)

Application:

The calibration oil used for nozzle testing is bound to have same properties throughout its service life. The specification for oil cleanliness is:

Water content:
300 PPM

Solid contamination:
ISO 4406 -/14/8, max. metallic particle size 150 µm.

Acidity (TAN): 0.3 mg KOH/g

Problem:

The oil cleanliness was out of specifications (1), having the following characteristics:

Water content:
662 PPM

Solid contamination:
ISO 4406 -/20/16, max. metallic particle size 159 µm, according to membrane analysis (3).

Acidity (TAN): 0.084 mg KOH/g

Solution:

Water contamination alone can have a detrimental effect on the fluid's thermo-oxidative stability but is greatly magnified with the combination of water and metal particles that act as catalysts to the reaction. It can be responsible for viscosity increase, varnish formation, sludge and sediment formation, additive depletion, base oil breakdown, loss in foam properties, acid number increase, rust and corrosion. The acid number, TAN, would be a clear proof that the oil has started to lose its properties.

To prevent this effect, it's necessary to remove water contamination down to 50%sat. Pall Oil Purifiers are based on mass transfer by boiling at low temperature in vacuum, which has no damaging effect on oil properties since the oil is not heated. By spraying the oil in thin films with big evaporation area inside a vacuum chamber, water and gases from the oil are transferred to the dry air and eliminated through the exhaust. The oil purifier can remove:

- free water and as much as 90% of dissolved water
- free and entrained gases and up to 90% of dissolved gases
- solid contaminants, with **Athalon** filter of efficiency of $\text{Beta}_{\text{x}}(\text{c}) \geq 2000$ (down to 3 microns).

To prevent the oil degradation, the oil purifier Pall HNP021 was tested. Laboratory analysis of the oil after purification show the efficiency of the purifier:

Water content: 287 PPM

Solid contamination: ISO 4406 -/11/8, max. metallic particle size 97 µm, according to membrane analysis (4).

Acidity (TAN): 0.034 mg KOH/g

Benefits:

- ✓ Ensure proper nozzle testing
- ✓ Increased fluid life (can be reused for testing)
- ✓ Cost reduction due to increased life