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### Total Base Number (TBN)

**Definition:** TBN measures the amount of alkaline reserve in the oil, expressed in milligrams of potassium hydroxide (KOH) per gram of oil. It indicates the oil's ability to neutralize acids formed during combustion.

**Typical Values:** New diesel engine oils usually have a TBN ranging from 6.0 to 13.0 mg KOH/g, depending on the formulation and intended application.

**Importance:** A higher TBN is essential in environments with high sulfur fuel, as it helps prevent corrosive wear from acid buildup. As the oil ages, TBN depletes, indicating that the oil may need to be changed.

### Total Acid Number (TAN)

**Definition:** TAN measures the concentration of acidic constituents in the oil. It reflects the accumulation of acids from oxidation and contamination over time.

**Typical Values:** TAN values generally remain stable until TBN drops significantly, after which TAN starts to rise, indicating increased acidity in the oil.

**Importance:** Monitoring TAN is crucial as an increase can signal degradation of oil quality and potential corrosive damage to engine components.

### Monitoring TBN and TAN

#### Regular Testing:

Conduct routine oil analysis to monitor both TBN and TAN levels. This helps in determining optimal oil drain intervals and preventing engine damage.

Use reliable laboratories that adhere to ASTM standards for accurate results (e.g., ASTM D4739 for used oils).



#### Interpreting Results:

When TBN depletes to about 50% of its original value, TAN begins to rise significantly. The point where TAN exceeds TBN indicates that the oil should be changed.

Maintain a proactive approach by planning oil changes before reaching this critical point to avoid corrosion and wear.

#### Understanding Fuel Quality:

The sulfur content in fuel directly affects TAN and TBN dynamics. Higher sulfur fuels lead to faster increases in TAN due to more acid formation.

Adjust maintenance practices based on local fuel quality regulations.

#### Best Practices for Oil Management

**Combine Testing Parameters:** Alongside TBN and TAN, monitor other parameters such as viscosity, oxidation levels, and wear metals for a comprehensive view of oil health.

**Educate Personnel:** Ensure that maintenance teams understand the significance of TBN and TAN in relation to engine performance and longevity.

**Adapt Maintenance Schedules:** Use data from oil analysis to tailor maintenance schedules based on actual operating conditions rather than fixed intervals.

#### Conclusion

By effectively monitoring and interpreting TBN and TAN levels in diesel engine oils, operators can optimize maintenance practices, extend engine life, and reduce operational costs. Regular testing combined with an understanding of how these parameters interact will lead to better decision-making regarding oil changes and overall engine management.