EPT™
CLEAN OIL

LUBRICANT CHEMISTRY MANAGEMENT

KEY #7 TO OIL ANALYSIS SUCCESS

The sample is exposed to high-temperature plasma, which ionizes the fluid at an extreme temperature and breaks it down to individual atoms. This allows the instrument to identify and measure the 20 metals associated with the detection of wear, additives, and contamination.

ICP-OES | Dissolved Metals Testing

What is Dissolved Metals Testing (ICP-OES)?

Dissolved metals testing is a laboratory method used in oil analysis to measure trace metallic elements in a lubricant. It uses ICP-OES (Inductively Coupled Plasma – Optical Emission Spectroscopy), an advanced technique that detects metals at extremely small concentrations, typically reported in parts per million (ppm).

Why It Matters!

Lubricants carry valuable information about the systems they protect. As equipment operates, microscopic particles from components, additives, or external contaminants can become suspended in the oil. Dissolved metals testing helps detect and measure these elements before problems become visible or catastrophic.

Different metals can reveal different conditions within the system. Wear metals such as iron, chromium, aluminum, and copper may indicate component wear or mechanical damage. Additive elements like zinc, calcium, magnesium, and phosphorus help confirm the presence and health of the oil's protective additives. Contaminant metals including silicon, sodium, potassium, and boron may signal the intrusion of dirt, coolant, or other foreign materials.

How It Works

In the laboratory, a small oil sample is introduced into the ICP-OES instrument, where it is converted into a fine aerosol and injected into a plasma torch operating at extremely high temperatures. The intense heat excites the atoms in the sample, causing each element to emit light at a specific wavelength.

The instrument measures the intensity of this light to determine the concentration of each element present. Results are reported in parts per million (ppm) and typically include a panel of metals related to wear, additives, and contaminants.

By trending these results over time and comparing them with baseline values, analysts and maintenance teams can identify patterns that may indicate developing equipment wear, additive depletion, contamination, or lubricant mix-ups. This insight allows operators to take action early keeping equipment reliable, efficient, and performing at its best.