



KEY #8 TO OIL ANALYSIS SUCCESS



Understanding how much oxidation resistance remains in your lubricant is critical and provides insight into the overall condition of your lubricant. This is determined through the LSV test method.

Antioxidant Testing | Linear Sweep Voltammetry (LSV)

What is Antioxidant Testing (LSV)?

Antioxidant testing is a oil analysis method used to measure the remaining protective additives in a lubricant. The most common technique, Linear Sweep Voltammetry (LSV) testing, measures key antioxidants such as amine and phenol compounds that protect oil from oxidation. Results are compared to new oil to show how much antioxidant protection remains.

Why It Matters!

Lubricants degrade over time as their additives are gradually used up. Antioxidants act as a protective defense, reacting with oxygen to prevent the base oil from breaking down. As these antioxidants are depleted, the oil becomes more vulnerable to oxidation, sludge, and varnish formation. Monitoring antioxidant levels through routine oil analysis helps maintenance teams determine how much protection remains and identify when the lubricant is nearing the end of its service life, allowing action to be taken before equipment problems occur.

How It Works

During LSV testing, a small oil sample is analyzed using an electrochemical instrument equipped with electrodes. The test applies a controlled voltage sweep to the sample, which causes antioxidant molecules to react at specific points during the process. By measuring the electrical response, the instrument can determine the concentration of the remaining amine and phenol antioxidants.

Results are reported as a percentage of the original antioxidant levels compared with a new oil sample of the same type and brand. Because the test is comparative, using the correct baseline sample is critical to ensure accurate interpretation.

Individual LSV results can vary slightly typically within about 13–26% for the same sample. For this reason, results are most valuable when trended over time rather than evaluated as a single data point.

When antioxidant levels consistently fall below approximately 25% of their original value, the lubricant has typically reached the end of its effective life and corrective action should be considered. By monitoring antioxidant depletion, maintenance teams gain a clearer understanding of lubricant health and can keep equipment operating reliably, efficiently, and protected for longer.

