Diesel Engine Used Oil Analysis – Copper

Copper readings in used diesel engine oil analysis are second only to iron in prevalence and magnitude. Copper levels in general fluctuate more than any other oil analysis element, because copper sources in the engine release copper into the engine oil faster than mechanical wear of moving parts.

Cooler leaching of new engines can account for high copper readings as a result of the additives in the engine oil forming a coating on the surface of the copper tubing. Once this coating is established, the copper readings will drop down to the low levels typical for mechanical wear. However, if there is a change in oil chemistry, the coating layer will reform with the new chemistry sometimes causing high copper readings until the new coating is established.

High copper readings can also result from a coolant leak. Often these readings are accompanied by detection of coolant additives – sodium, potassium, molybdenum, silicon and others.

Copper is the largest component of brass and bronze, and is commonly found in bushings (rocker arms, wrist pins, etc.) and bearings (turbo, camshaft, and crankshaft) in the engine. Other sources of copper include the oil pump and the governor.

Copper from wear debris will rarely produce concentrations greater than 50 ppm; Concentrations of 10-20 ppm would be more typical in diesel engines.

Source: Practicing Oil Analysis

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