POLARIS™ Laboratories

Change Maintenance Practices – Not Alarm Limits – To Effectively Monitor Soot Levels in EGR Engines

TECHNICAL BULLETIN

The growing popularity of EGR (exhaust gas recirculation) engines has raised the question, “What is an acceptable level of soot?” and if I can expect a higher level of soot in an EGR engine, "Then why not raise the oil analysis alarm limit?"

Soot is soot. Knowing that a particular engine design creates and retains more of it doesn't make higher levels acceptable. Alarm limits should remain the same — maintenance practices should change. Utilizing enhanced additive packages with more efficient dispersants and closely monitoring the condition of the oil between oil changes to determine optimum drain intervals is the better solution.

Unlike gasoline engines, fuel in a diesel engine is injected during the compression stroke. The high pressure ignites the fuel immediately allowing it no time to properly mix with air. Combustion is incomplete and soot is created. Engine designs of the past expelled most of the soot created by inefficient fuel combustion through the exhaust, but EGR engines re-circulate exhaust gases back into the cylinder at a lower temperature to reduce NOx emission. Retarding ignition timing and reducing the amount of oxygen in the cylinder produces less NOx but inhibits combustion and creates excess soot.

If not adequately dispersed within the oil, soot particles begin to agglomerate, or gather into clusters increasing viscosity and allowing deposits to form on metal surfaces. Thick, sooty oil can plug filters and increase operating temperatures which can cause lubrication starvation and ultimately, metal on metal contact. The soot then becomes a harsh abrasive that accelerates wear in cylinder liners, rings, piston skirts, journal bearings and valve trains.