

The Reduction of Sub Micron particulate contamination in lubricating and hydraulic oils reduces electrostatic charging and spark discharge

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Abstract:

Electrostatic charging in lubricating hydraulic, and insulating oils is well documented in literature. These charges build up on filters and the ends of return lines until balanced by resistive dissipation currents or the dielectric breakdown voltage of the fluid (ASTM D877) is exceeded. These electrical discharges within the oil cause oxidation of the base oils and the creation of free radicals at rates hundreds of times higher than normal oxidation from air.

Recent developments in the measurement and quantification of sub micron contamination in oils permit the correlation of contamination size, level and charging within these oils not practical in the past. New ASTM Standards being developed will include these techniques within standard practice for measuring these particles.

Recent changes to global petroleum refining of fuels and lubricants in response to environmental requirements to eliminate sulfur and metals from these fluids have increased the occurrence of spark discharging in operating machinery by one thousand times. This makes the control of these small particles essential to controlling the resulting products of oxidation and varnish.