How Electrostatic Filters Control Varnish

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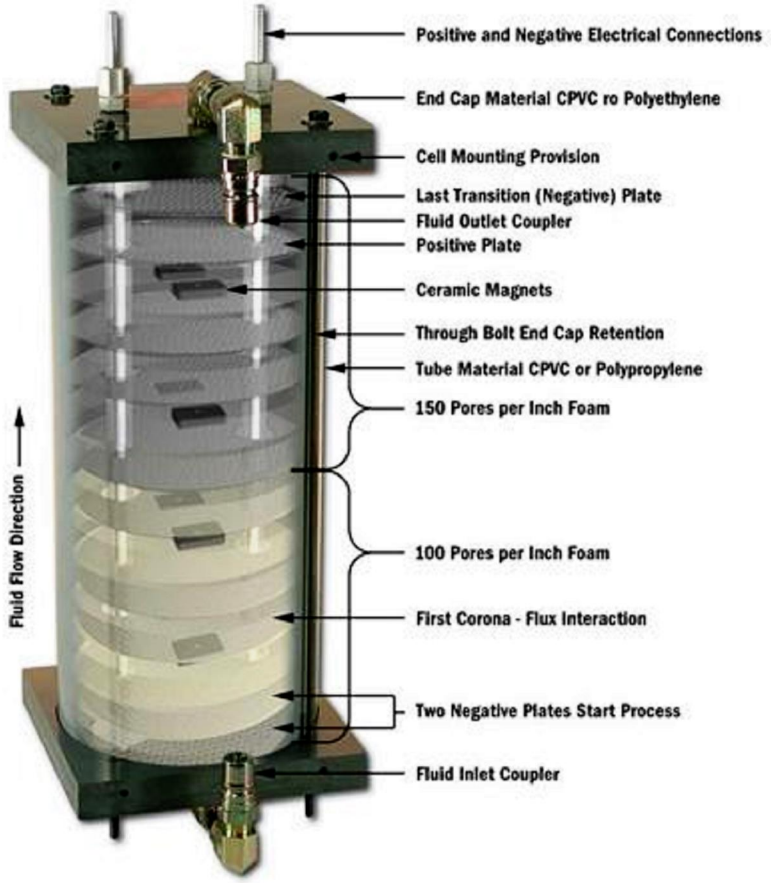

Electrostatic Cell Construction

"What are electrostatic separators? Are they different from regular filters?"

Electrostatic separators remove insoluble byproducts of thermal and oxidative oil degradation (varnish particles) and submicron hard dirt or wear particles that are too small to be removed by conventional mechanical filters.

Submicron hard particles are usually polar or attracted to other polar surfaces by nature. Varnish particles are typically polar as a result of the thermal or oxidative process that produced them. As a result, when a polar particle is passed through a high potential (high voltage, no current) electrostatic field, it is attracted to the negative or positive pole in the field, whichever is opposite the particle's charge. It is similar to a magnet being attracted to the opposite pole of another magnet.

There is evidence that these devices work quite well assuming the conditions for their use are good, the devices are sized properly (they operate on a low-flow multi-pass principle), no water is present (water compromises the electrostatic field by carrying current) and the oil doesn't contain detergents and dispersants that hold the contaminants in suspension.

The strength of electrostatic filters lies not in their ability to remove solid particles, often referred to as "hard" particles, but in removing unwanted "soft" particles, such as oil degradation byproducts. Left unchecked, it is these degradation byproducts that plate out on critical machine surfaces like valves, pipe work, bearings and coolers, causing varnish and sludge build-up.

Electrostatic off-line fluid filtration is gaining in popularity and use as knowledge and experience with these systems spreads. Formerly considered a high-end capital expenditure, electrostatic filtration systems have now bridged the gap between price and performance. While these off-line systems cannot take the place of in-line, high-pressure mechanical filters, they can be very effective in helping to control hard and soft particles, as well as sludge and varnish build-up, when used in conjunction with conventional filters. This is particularly true in high-pressure hydraulic systems and other circulating systems where compressive heating and other stressing factors make oil degradation a real problem.

Electrostatic filtration is not a "one-pass" technology. To achieve and maintain the lowest ISO cleanliness levels possible, the reservoir's entire contents must pass through the system about once every 24 hours. Due to the nature of the forces at work inside the electrostatic cell, flow rates of these systems are fairly low. On typical hydraulic systems, flow rates ranging from 30 to 80 gallons per hour are common. Nevertheless, even at these

comparatively low flow rates, electrostatic filtration can be an effective proactive solution to maintaining optimal fluid condition.

When conditions are right, electrostatic separators make an excellent addition to an overall contamination control strategy, bringing into balance the focus upon large particles and water with the elimination of varnish particles and silt.