CONTROLLING VARNISH

NEW AND UPGRADED SYSTEMS AIM TO REMOVE AND PREVENT VARNISH

Since varnish deposits started showing up increasingly in gas turbine lube oil systems (p. 11, July/August 2006), vendors have stepped in to introduce several products and approaches to address the problem. While oil companies have introduced new formulations, other vendors are attacking various causes of varnish through their new and upgraded systems.

Learning experience

Shell lubricants has reformulated its Shell Turbo Oils CC range offering improved deposit resistance for increased turbine reliability and availability. The new range is claimed to help tackle the problem of lacquer or varnish formation in servo valves, which causes the valves to stick or seize.

C.C. Jensen's (Svendborg, Denmark) static filters (Figure 1) are made of cellulose fiber and remove the varnish using the principle of adsorption in which the particles bind to the surface of the media as opposed to being absorbed in the filter media. Therefore, the capacity to adsorb varnish particles improves with surface area. One gm of cellulose has a surface area of 400 m^2, and one filter insert has 3,628 gms of cellulose — equivalent to the surface area of 302 football fields. Filter changes are recommended once every six months or a year, depending on the severity of service.

The Oilkleen Green Macheen (Figure 2) by Oilkleen International, Inc. (Scottsdale, AZ) has a series of electrostatic oil filters that create 18 energy fields. The contaminated oil is forced through these fields at a specific flow rate. The 15,000 V of energy inside each field pulls the sub-micron contamination particles out of the oil. The fluid contamination particles bond to the millions of sharp edges in the collection media inside the Oilkleen filter cartridge. Field trials on a GE Frame 7 show a reduction in the QSA varnish potential rating — a standard test by Analysts, Inc. — from 85 to 7 within seven days of installing the Green Macheen.

A single unit removes both water contamination and varnish. The computer in the unit detects and removes water down to 25 ppm.

The Green Macheen comes in three

Figure 1: C.C. Jensen's varnish removal skid has four replaceable cellulose filters, each capable of removing 8 lbs of varnish

classifications: 300, Water-X, 500. Oil chiller is optional in 300 and 500, while Water-X has water-removal features. The 300 machine has a flow rate of 300 gallons/hour and has a 12-gallon tank capacity. The Water-X has a flow rate of 300 gallons-hour and a tank capacity of 24 gallons. The 500 has a flow rate of 500 gallons per hour and a tank capacity of 24 gallons.

Meanwhile, UAS Kleentek (Cincinnati, OH) has introduced an electrostatic oil conditioning system for use in hazardous locations. These use the patented Kleentek technology that employs electrostatic forces to remove contaminants from the oil that cause tar, varnish or sludge. Applications include refinery, natural gas and chemical and petrochemical environments.

The model features a purge system where inert gas is used to pressure the enclosure, preventing explosive gases, vapors or dusts from entering the equipment. The system does not need operator supervision and can run continuously.

Isopur Fluid Technologies, Inc. (Pawcatuck, CT) has introduced the LR20, which is its low-range system with flow rates of up to 2 gallons per minute. The LR20 features the same intelligent control system as the big machines, and is based on the Parker Filtration Division CN-40 series of pressure housings.

The charging and mixing unit uses new technology that reduces back pressure while increasing charge density and mixing time. This machine is designed for smaller volume hydraulic and lubrication systems. It is available in explosion-proof versions.

Figure 2: Oilkleen's Green Macheen 500 creates 18 static energy fields and allows a flow rate of 500 gallons per hour

Figure 3: Hilliard has introduced anti-static filter elements that reduce static discharge and promote lube oil conductivity

Hilliard Corporation (Elmira, NY) advocates a preventative approach to the problem of varnish. It says that a key cause of varnish formation is the low conductivity of the lube oil, which leads to precipitation of varnish particles.

Hilliard has introduced new filter elements that reduce the occurence of static discharges. These impregnated filter media (Figure 3) improve the lube oil's conductivity, the company claims. One commercial size 718 element of this filter medium is capable of treating up to 3,000 gallons of lube oil

According to Hilliard, field trials demonstrate that the company's anti-static filter elements reduce the lube oil's moisture content and Total Dissolved Gases content. Gases dissolved in the lube oil are a key cause of micro-dieseling that creates sub-micron particles leading to varnish formation. TI