Varnish Potential Testing

Identifying Varnish & Sludge Potential in Oil

Membrane Patch Colorimetry

MEMBRANE PATCH COLORIMETRY (MPC) TRACKS THE AMOUNT OF INSOLUBES PRESENT IN THE LUBRICATING OIL SO YOU CAN ACT BEFORE HARMFUL VARNISH AND SLUDGE BUILD-UP OCCURS ON CRITICAL COMPONENTS.

OVERVIEW

- Identifies the oils potential for harmful varnish and sludge build-up.
- Easy to read MPC rating makes maintenance decisions easier.
- Provides a level of confidence when establishing extended oil drains on critical equipment.
- Testing can be conducted routinely, by exception, or as a yearly adjunct to the regular testing package.

BENEFITS

In industrial equipment like turbines, injection moulding machines, and large hydraulic systems the oil may be in use for many years before a complete oil change. Such equipment run the risk of harmful varnish and sludge build-up if not properly monitored.

As oils age in operation, lubricant degradation products are formed. Many of these products are highly acidic, and negatively affect the acid level of the oil. Other degradation products have high molecular weights and are insoluble in the oil. Lubricating oils have some degree of 'solvency' that allows for the suspension of these insoluble products for a period of time. As the level of insolubles builds-up in the oil eventually these products drop out and harmful varnish and sludge forms on components.

Until now oil analysis testing was blind to the potential for varnish and sludge build-up in lubricated systems. Traditional oil analysis testing measures parameters, like the Acid Number (AN) of an oil, in order to assess the lubricant degradation of an oil. In many cases the AN test is the sole indicator of the necessity of an oil change.

Now with Membrane Patch Colorimetry, oil analysis has a tool to easily identify oils that have a high varnish potential giving the operator time to schedule an oil change before harmful varnish build-up can cause mis-operation of sensitive components, and the failure of critical equipment.

When utilized in conjunction with a regular oil analysis program, membrane patch colorimetry provides the confidence in determining proper oil change intervals. In the long-term this can mean the difference between cost savings as the result of safely extending oil drains versus major equipment damage and failure as the result of harmful varnish build-up.

THE LEADER IN OIL ANALYSIS

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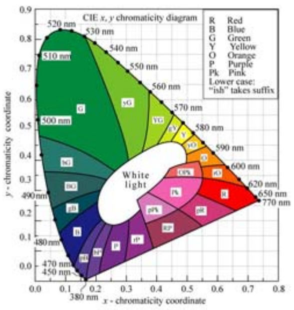
MPC RATING SCALE

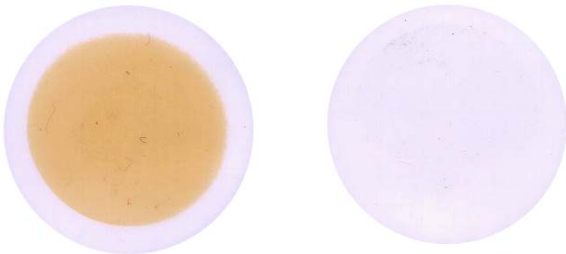
0-15	15-30	30-40	>40
Normal	Monitor	Abnormal	Critical

<u>CIELAB Scale</u> – The MPC method utilizes a visible light spectrometer to determine the varnish potential. The MPC method uses the CIELAB color scale as defined in ASTM E308. The CIELAB scale uses a color space defined by a, b, and L.



a* = change in color in the red spectrum
b* = change in color in the yellow spectrum
L* = change in shade from white to black

Manufacturing – Hydraulic System



This company routinely recycles the oils used in their hydraulic systems. The oil in question had been in use for over 10 years, receiving yearly recycling, and sweetening. This unit in particular has a reservoir capacity of over 5,000 liters (approx.1,200 gallons).

An oil sample from the unit was tested and found to have a marginally high AN result, and very high particle count. Membrane Patch Colorimetry also put this oil in the high varnish potential range. Images for color and clarity also showed poor clarity of the oil.

The client employed electrostatic filtration for several days, after which a subsequent sample revealed that the AN had dropped significantly, the particle count had dropped 4 ISO cleanliness codes (indicating the oil was 16 times cleaner), and the varnish potential was reduced from a 52 (critical) range to 5 (none).

Test Method	Before Electrostatic	After Electrostatic
AN (ASTM D664)	**0.67**	**0.59**
Particles > 4µm	**44,621**	**3,833**
Particles > 14µm	**8,799**	**675**
Particles > 16µm	**368**	**26**
ISO 4406:1999	**23/20/16**	**19/17/12**
MPC (Varnish Potential)	**52**	**6**

Samples that have already been analyzed* can be upgraded to include membrane patch colorimetry simply by phoning the laboratory and requesting this additional test.

**- Testing can only be conducted if samples are still in storage at the laboratory. Samples are typically stored for a period of 2 months prior to disposal.*

WEAR CHECK
THE LEADER IN OIL ANALYSIS

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