

Analytical Ferrography



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By analyzing the colour, morphology, size, and surface detail of ferrous and nonferrous wear particles, an experienced lab technician can provide accurate information about the type, severity and root cause of abnormal wear. This insightful historical data enables maintenance experts to implement predictive and effective actions based on this important information.



Analytical Ferrography Requires:

1. A skilled and experienced analyst.
2. A ferrogramatic slide.
3. Particle identification under a microscope.



Ferrography provides a detailed “forensic science” analysis of the particles generated by wear by describing the debris contents on a special microscope slide (aka Ferrogram). A Fluid Life senior analyst provides a detailed report identifying the type, nature and probable source of the wear particles along with relevant photographs of the ferrogram.

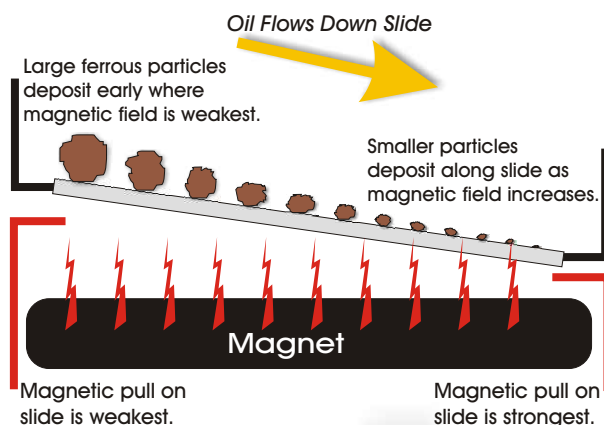
When implemented correctly analytical ferrography can provide:

- a powerful diagnostic tool for your maintenance program.
- a progressive extension to your conventional sampling program.
- excellent return on your oil analysis investment.

Fluid Life

Ferrous Particles:

During the creation of a ferrogram as shown below, ferrous particles will often line up to appear chain-like on the laboratory slide. These chain-like rows of ferrous particles will often act as a filtering mechanism, collecting copper particles, babbitt, and contaminants.



Ferrous Wear Metals

Wear Metal	Colour Before Heating	Colour After Heating	Description
Cast Iron	Grayish	Light yellow.	Align in chains among other ferrous particles
Dark Metallic Oxides	Black	Black	Gather in chains among other ferrous particles. Darkness can indicate degree of oxidation.
High Alloy Steel	Grayish white.	Grayish white.	High alloys will appear white in a chainlike structure.
Low Alloy Steel	Grayish-white.	Blue, pink or red.	Particles also found in chains.
Red Oxides (Rust)	Reddish orange.	Reddish orange.	Revealed by polarized light. Large amounts can indicate corrosive wear.

Other Particles

Particle	Colour Before Heating	Colour After Heating	Description
Babbitt	Gray	Gray with blue spots. Size decrease.	Usually lead or tin. Appear randomly on the slide.
Contaminants	White crystalline.	White crystalline.	Often dirt (silica), or other particulates. Appear randomly on slide often encircled by chains of ferrous particles.
Copper	Bright yellow.	Bright yellow.	Copper particles will be deposited randomly across the slide.
Fibers	Various	Various (no change)	From filters or outside contamination source. Often long translucent strings that will appear anywhere on the slide.
White non ferrous	Bright white.	Bright white.	Often chromium or aluminum. They are deposited randomly across the slide.

If the effort is taken to fully understand what analytical ferrography reveals, the benefits significantly outweigh the costs and maintenance professionals are wise to automatically incorporate it when abnormal wear is encountered.

Maintenance Solutions

Once the maintenance technician has the testing information to determine if there is wear metals or contaminants within a component a course of action can be determined.

If these conditions exist the maintenance professional could:

- ✓ Increase frequency of oil change intervals.
- ✓ Modify the maintenance schedule based on the run time of the specific component.

...because what happens on the inside really counts



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