

AVIATION LABORATORIES

factsheet

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Oil Filter Debris Analysis For Aircraft Engines

Why should filter debris analysis be combined with oil analysis? Both should be part of your Aircraft Engine Preventative Maintenance Program for the following reasons:

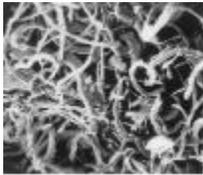
- When large wear particles are generated by an engine, they are often not preceded by, or occur at the same time as fine wear particles. Large wear particles are not detected by oil analysis, only the fine wear is. Large wear particles absolutely must be monitored separately by oil filter debris analysis.
- Filter debris analysis is recommended by most engine manufacturers as an important part of all preventative maintenance programs for turbine and piston aircraft engines.
- Oil analysis only monitors the fine suspended wear in the oil that is less than 10 microns. Oil filter analysis monitors the larger wear particles that are trapped by the filter. When oil analysis is combined with oil filter analysis all of the various wear particle sizes are closely monitored.
- Piston Engines: Course wear from piston engine components such as cams, bearings, and piston pin caps must be monitored by oil filter analysis. Oil analysis is extremely effective for piston engines because most of their abnormal wear modes usually begin with the generation of predominately fine wear of 10 microns or less. Oil filter analysis detects wear modes that have accelerated very quickly to large particle generation.
- Turbine Engines: Oil filter analysis is critical for turbine engines because their abnormal wear modes usually begin and continue with the generation of predominately large wear particles larger than 10 microns, from bearings, shafts, gear, seals, and other components. These larger wear particles are removed from the oil and trapped by 10 micron filtration or less and therefore they are not detected in the oil analysis sample. To monitor abnormal wear modes that generate large particles in turbine engines the oil filter must be analyzed. Turbine filters sent to the laboratory are routinely tagged, bubble wrapped, and returned to the customer if the return of filter is indicated on the test kit customer information form.



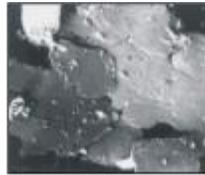
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**MS 5521
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What is the oil filter analysis process? An oil filter and an oil sample are sent to the laboratory for analysis. The oil filter debris is thoroughly rinsed from the oil filter with solvent. All of the debris removed is isolated onto a filter pad. The filter debris material is analyzed using Scanning Electron Microscopy combined with Energy Dispersive X-Ray Fluorescence, SEM/EDXRF. The non-destructive analysis of a mixture of many particles can easily be micro focused onto individual particles under high magnification. The exact alloys present in the filter debris are determined. The AMS number, amount, type, form, and condition of the particles are reported. The oil sample analysis is also performed.

What is an oil filter analysis kit? The filter analysis test kit includes a large bottle to package and ship the used oil filter element. An oil sample bottle, sampling hose, paperwork, shipping box, and labels are also included. Laboratory analysis is included in the kit cost.