

Table 5-1. Source of Oil Contamination

Silicon	A measure of airborne dust and dirt contamination, it usually indicates improper air cleaner service. Excessive dirt and abrasives accelerate engine wear and can greatly increase operating costs.
Iron	Indicates wear originating from any and all steel components, such as cylinder walls, rings, shafts, splines, gears, etc. High iron content can indicate corrosion if the engine has an inactive history. Often it will clean out with regular usage, if cylinders, cam, and lifters are not pitted.
Copper	Indicates wear from bearings and/or bushings.
Aluminum	Indicates piston metal, piston pin plugs, and can confirm airborne dirt.
Chromium	Originates from wear of engine parts that have been chromed, primarily compression rings or cylinder walls.
Magnesium	Water reacts with magnesium casings and is carried in the oil. Magnesium also may be an oil additive.
Silver	Present in the bearing alloys of a limited number of engines, such as the Lycoming supercharged engine, radial-engine master rods, and E series continentals front main bearing.
Nickel	Can indicate wear from certain types of rings, bearings, and valves or turbo shaft.
Tin	Indicator of wear from bearings.
Lead	In gasoline engines, the main source of lead is from tetraethyl lead contamination.

trace metals than if you had used mineral oil. This is because synthetics result in less wear due to their higher film-temperature gradient.

The overall oil analysis program benefits include reduced in-service equipment failures, easier scheduling of repairs, identification of maintenance deficiencies and operator abuse, simplification of the decision to “buy or repair,” and help in the evaluation of trade-ins and rentals.

To assure engine longevity, the prudent pilot will use the appropriate oil for the engine and operating conditions; maintain sufficient quantity; change it in accordance with manufacturer’s recommendations; maintain an engine oil analysis program; and be aware of what engine instruments are saying. If pressures and temperatures are running at a significantly different level than normal, there is something wrong.