



## POSSIBLE SOURCES OF ELEMENTS IN OIL

1. Aluminum (AL) - Pistons, bearings, bushings, pump vanes, blower/turbos, washers, dirt, shims
2. Antimony (Sb) - Babbit bearings, greases
3. Barium (Ba) - New oils (dispersant/detergent), grease, water
4. Boron (B) - New oils, coolant, seals, dust, fuel dilution
5. Cadmium (Cd) - Bearings, platings
6. Calcium (Ca) - New oils (dispersant/detergent), water, grease
7. Chromium (Cr) - Plated parts (primarily piston rings), coolant, anti-friction bearings, shafts, gears, seals, bearing cages
8. Cobalt (Co) - Bearings, turbine components
9. Copper (Cu) - Bearings, bearing cushions, bushings, thrust washers, valves, guides, injector shields, oil cooler tubes, wet clutches, coolant (copper radiator), gears
10. Iron (Fe) - Rings, crankshaft, cylinder walls, valve train, pistons, anti-friction bearings, gear train, shafts, clutch plates, washers, rust, water
11. Lead (Pb) - Babbit or copper-lead bearings, platings, leaded gear lubes, leaded gasoline, grease, paint, seals, solder
12. Magnesium (Mg) - New oils (dispersant/detergent), bearings, superchargers, water
13. Manganese (Mn) - Steels, shafts, valves, corrosion, blowers (exhaust & intake systems)
14. Molybdenum (Mo) - Additives, piston rings, electric motors
15. Nickel (Ni) - Shafts, valves, anti-friction bearings, gears, rings, turbine components
16. Phosphorous (P) - New oils (zinc dithiophosphate) chlorinated phosphorus anti-wear additives, gears, coolant leaks

17. Silicon (Si) - Sand, dirt, dust, anti-foam, anti-freeze, gasket sealing compounds
18. Silver (Ag) - Anti-friction bearings, silver solder, wrist pin bushings, gear teeth, shafts
19. Sodium (Na) - Some new oils, coolant, salt water, grease
20. Tin (Sn) - Babbit bearings, platings, solder, coolers, wrist pins, pistons, rings
21. Titanium (Ti) - Wear turbine engines, springs, valves, bearing hub, compressor discs, turbine blades
22. Vanadium (V) - By product heavy fuel oil, occasionally wear metal, turbine blades, valves
23. Zinc (Zn) - Anti-oxidant, anti-corrosive, anti-wear agent, bearings, platings, gears, seals, coolant leaks, grease