

## Possible Sources of Elements in Oil

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|------------------------|------|---|
| 1. <b>Aluminum</b>     | (Al) | Pistons, bearings, bushings, pump vanes, blower/turbos, washers, dirt shims   |
| 2. <b>Antimony</b>     | (Sb) | Babbitt bearings, greases   |
| 3. <b>Barium</b>       | (Ba) | New oils (dispersant/detergent), grease, water  |
| 4. <b>Boron</b>        | (B)  | New oils, coolant, seals, dust, fuel dilution   |
| 5. <b>Cadmium</b>      | (Cd) | Bearings, platings  |
| 6. <b>Calcium</b>      | (Ca) | New oils (dispersant/detergent), water, grease  |
| 7. <b>Chromium</b>     | (Cr) | Plated parts (primarily piston rings), coolant, anti-friction bearings, shafts, gears, seals, bearing cages, fuel leaks gas turbines                    |
| 8. <b>Cobalt</b>       | (Co) | Bearings, turbine components  |
| 9. <b>Copper</b>       | (Cu) | Bearings, bearing cushions, bushings, thrust washers, valves, guides, injector shields, oil cooler tubes, wet clutches, coolant (copper radiator) gears |
| 10. <b>Iron</b>        | (Fe) | Rings, crankshaft, cylinder walls, valve train, pistons, anti-friction bearings, gear train, shafts, clutch plates, washers, rust, water                |
| 11. <b>Lead</b>        | (Pb) | Babbitt or copper-lead bearings, platings, leaded gear lubes, leaded gasoline, grease, paint, seals, solder   |
| 12. <b>Magnesium</b>   | (Mg) | New oils (dispersant/detergent), bearings, superchargers, water   |
| 13. <b>Manganese</b>   | (Mn) | Steels, shafts, valves, corrosion, blowers (exhaust & intake systems)   |
| 14. <b>Molybdenum</b>  | (Mo) | Additives, piston rings, electric motors  |
| 15. <b>Nickel</b>      | (Ni) | Shafts, valves, anti-friction bearings, gears, rings, turbine components  |
| 16. <b>Phosphorous</b> | (P)  | New oils, (anti-wear additives), gears, coolant leaks   |
| 17. <b>Silicon</b>     | (Si) | Sand, dirt, dust, anti-foam, anti-freeze, gasket sealing compounds  |
| 18. <b>Silver</b>      | (Ag) | Anti-friction bearings, silver solder, wrist pin bushings, gear teeth, shafts   |
| 19. <b>Sodium</b>      | (Na) | Some new oils coolant, salt water, grease   |
| 20. <b>Tin</b>         | (Sn) | Babbitt bearings, platings, solder coolers, wrist pins, pistons, rings  |
| 21. <b>Titanium</b>    | (Ti) | Wear turbine engines, springs, valves, bearing hub, compressor discs, turbine blades  |
| 22. <b>Vanadium</b>    | (V)  | By product heavy fuel oil, occasionally wear metal, turbine blades, valves  |
| 23. <b>Zinc</b>        | (Zn) | Anti-oxidant, anti-corrosive, anti-wear agent, bearings, platings, gears, seals, coolant leaks, grease  |

