

ELEMENT SOURCE TABLE

What's in my fluids & where could it come from?



WEAR METALS

METAL	ENGINE	TRANSMISSION	GEARS	HYDRAULICS	AIR COMPRESSOR
Iron (Fe)	Cylinder Liners, Rings, Gears, Crankshaft, Block, Camshaft, Valve Train, Oil Pump Gear, Wrist Pins	Gears, Discs, Housing, Bearings, Brake Bands, Shaft	Gears, Bearings, Shaft, Housing	Rods, Cylinders, Gears, Bearings, Valves, Pump Housing	Crankshaft, Block, Housing, Screws, Bearing, Shaft, Oil Pump, Piston Rings, Cylinder
Chromium (Cr)	Rings, Liners, Exhaust Valves, Shaft Plating, Stainless Steel Alloy	Roller Bearings, Water Treatment (Oil Cooler)	Roller Bearings	Shaft	Rings, Roller/Taper, Bearings (some), Water Treatment (Oil Cooler)
Aluminium (Al)	Pistons, Thrust Bearings, Turbo Bearings, Main Bearings (Caterpillar), Blower	Pumps, Thrust Washers, Bushings	Pumps, Thrust Washers	Bearings, Thrust Plates	Rotors, Pistons, Bearings, Thrust Washers, Block, Housing
Nickel (Ni)	Valve Plating, Steel Alloy from Crankshaft, Camshaft, Gears from Heavy Bunker Type Diesel Fuels	Steel Alloy from Roller Bearings and Shaft	Steel Alloy from Roller Bearings and Shaft	Cylinders, Rams, Pumps, Roller Bearings (some)	N/A
Copper (Cu)	Lube Coolers, Main & Rod Bearings, Bushings, Turbo Bearings, Lube Additive, Governor	Bushings, Clutch Plates (Auto/Powershift), Lube Coolers	Bushings, Thrust Plates	Bushings, Thrust Plates, Lube Coolers	Wear Plates, Bushings, Wrist Pin Bushings, Bearings (Recip), Thrust Washers
Lead (Pb)	Main and Rod Bearings, Bushings, Lead Solder	Bushings (Bronze Alloy), Lube Additive Supplement	Bushings (Bronze Alloy), Grease Contamination	Bushings (Bronze Alloy)	Bushings, Bearings
Tin (Sn)	Piston Flashing, Bearing Overlay, Bronze Alloy, Babbit Metal along with Copper and Lead	Bearing Cage Metal	Bearing Cage Metal, Lube Additive, Journal Bearings	N/A	Pistons (Overlay), Bearings (Overlay)
Cadmium (Cd)	N/A	Plating	Plating	N/A	N/A
Silver (Ag)	Wrist Pin Bushings (EMSs), Silver Solder (from Lube Coolers)	Torrington Needle Bearings (Allison)	N/A	Silver Solder (from Lube Coolers)	N/A
Titanium (Ti)	Gas Turbine Bearings/Hub/Blades, Paint (white lead)	N/A	N/A	N/A	N/A
Vanadium (V)	From Heavy Bunker Type Diesel Fuels	N/A	N/A	N/A	N/A

CONTAMINANT METALS

METAL	ENGINE	TRANSMISSION	GEARS	HYDRAULICS	AIR COMPRESSOR
Silicon (Si)	Dirt, Seals, and Sealants, Coolant Inhibitor, Lube Additive (12 ppm or less)	Dirt, Seals, and Sealants, Coolant Inhibitor, Lube Additive (12 ppm or less)	Dirt, Seals, and Sealants, Coolant Inhibitor, Lube Additive (12 ppm or less)	Dirt, Seals, and Sealants, Coolant Inhibitor, Lube Additive (12 ppm or less)	Ingested Dirt
Sodium (Na)	Lube Additive, Coolant Inhibitor, Salt Water Contamination, Wash Detergents	Lube Additive, Coolant Inhibitor, Salt Water Contamination, Wash Detergents	Lube Additive, Salt Water Contamination, Airborne Contaminant	Lube Additive, Coolant Inhibitor, Salt Water Contamination, Airborne Contaminant	Oil Additives, Ingested Dirt, Anti-Freeze
Potassium (K)	Coolant Inhibitor, Airborne Contaminant	Coolant Inhibitor, Airborne Contaminant	Coolant Inhibitor, Airborne Contaminant	Coolant Inhibitor, Airborne Contaminant	N/A

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MULTI SOURCE METALS

METAL	ENGINE	TRANSMISSION	GEARS	HYDRAULICS
Molybdenum (Mo)	Ring Plating, Lube Additive, Coolant Inhibitor	Lube Additive, Coolant Inhibitor	Lube Additive, Coolant Inhibitor, Grease Additive	Lube Additive, Coolant Inhibitor
Antimony (Sb)	Lube Additive	Lube Additive	Lube Additive	Lube Additive
Manganese (Mn)	Steel Alloy	Steel Alloy	Steel Alloy	Steel Alloy
Lithium (Li)	N/A	Lithium Complex Grease	Lithium Complex Grease	Lithium Complex Grease
Boron (B)	Lube Additive, Coolant Inhibitor	Lube Additive, Coolant Inhibitor	Lube Additive, Coolant Inhibitor	Lube Additive, Coolant Inhibitor

ADDITIVE METALS

METAL	ENGINE	TRANSMISSION	GEARS	HYDRAULICS
Magnesium (Mg)	Detergent Dispersant Additive, Airborne Contaminant	Detergent Dispersant Additive, Airborne Contaminant	Detergent Dispersant Additive, Airborne Contaminant	Detergent Dispersant Additive, Airborne Contaminant
Calcium (Ca)	Detergent Dispersant Additive, Airborne Contaminant, Contaminant from Water	Detergent Dispersant Additive, Airborne Contaminant, Contaminant from Water	Detergent Dispersant Additive, Airborne Contaminant, Contaminant from Water	Detergent Dispersant Additive, Airborne Contaminant, Contaminant from Water
Barium (Ba)	Usually an Additive from Synthetic Lubricants	Usually an Additive from Synthetic Lubricants	Usually an Additive from Synthetic Lubricants	Usually an Additive from Synthetic Lubricants
Phosphorus (P)	Anti-Wear Additive (ZDP)	Anti-Wear Additive (ZDP)	Anti-Wear Additive (ZDP), EP Additive (Extreme Pressure)	Anti-Wear Additive (ZDP)
Zinc (Zn)	Anti-Wear Additive (ZDP)	Anti-Wear Additive (ZDP)	Anti-Wear Additive (ZDP)	Anti-Wear Additive (ZDP)

**This chart is for reference only. Contact the Cashman Fluids Analysis lab for more details.*

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