

WEAR METALS SOURCE

WEAR METALS

IRON

ENGINE	Cylinder Block, Cylinder Liners, Gears , Crankshaft, Piston Rings, Camshaft, Valve Train, Oil Pump.
TRANSMISSION	Gears, Discs, Housing, Bearings, Brake Bands, Shift Spools, Pumps, PTO-Power Take Off
HYDRAULIC SYSTEM	Pump / Motor Vanes, Gears, Pistons, Cylinder Boxes & Rods, Bearings, Valves, Pump Housing
GEAR SYSTEM	Gear, Shafts, Bearings
COMPRESSORS	Crankshaft Block, Housing, Screws, Bearings, Shaft, Oil Pump, Piston Rings, Cylinders
TURBINE	Shafts, Gears, Bearings, Valves

CHROMIUM

ENGINE	Pistons, Piston Rings, Roller / Taper, Bearings, Cylinder Liners, Exhaust Valves, Water Treatment
TRANSMISSION	Roller / Taper, Bearings, Water Treatment (Oil Cooler)
HYDRAULIC SYSTEM	Rods, Spools, Roller / Taper, Bearings
GEAR SYSTEM	Roller / Taper, Bearings
COMPRESSORS	Rings, Roller / Taper, Bearings, Water Treatment (Oil Cooler)
TURBINE	Shafts, Bearings

COPPER

ENGINE	Piston Pin Bushings, Valve Train Bushings, Cam Bushings, Bearings, Oil Cooler, Thrust Washers, Oil Pump bushings, Oil Additives.
TRANSMISSION	Clutches, Steering Discs, Bushings / Thrust Washers, Oil Cooler
HYDRAULIC SYSTEM	Pump Thrust Plates, Pump Pistons, Cylinders, Guides, Bushings, Oil Cooler
GEAR SYSTEM	Bushings, Thrust Washers
COMPRESSORS	Wear Plates, Bushings, Wrist Pin Bushings, Bearings, Thrust Washers
TURBINE	Bearings, Bushings, Thrust Plates, Cooler Core Tubing

ALUMINIUM

ENGINE	Pistons, Bearings, Bushings, Cylinder Blocks, Housings, Oil Pump Bushings, Turbocharger Impeller , Thrust Bearings
TRANSMISSION	Pumps, Clutches, Thrust Washer, Bushings
HYDRAULIC SYSTEM	Pump / Motor, Housing, Cylinder
GEAR SYSTEM	Thrust Washers, Oil Pump, Bushings, Some Greases
COMPRESSORS	Rotors, Pistons, Bearings, Thrust Washers, Block Housing
TURBINE	Thrust, Heat Exchanger Core, Aluminium Oxides from Silica(Dirt ingestion)

TIN

ENGINE	Bearings (Babbit), Bushings
TRANSMISSION	Roller / Taper, Bearings, Water Treatment (Oil Cooler)
HYDRAULIC SYSTEM	Rods, Spools, Roller / Taper, Bearings
GEAR SYSTEM	Roller / Taper, Bearings
COMPRESSORS	Rings, Roller / Taper, Bearings, Water Treatment (Oil Cooler)
TURBINE	Bearings (Babbit), Bushings, Solder from Tin

LEAD

ENGINE	Bearings, Gasoline, Octane Improver, Oil Additives
TRANSMISSION	Oil Additives
HYDRAULIC SYSTEM	Not Found
GEAR SYSTEM	Oil Additives
COMPRESSORS	Bearings
TURBINE	Bearings, Bushings (Babbit)

SILVER

ENGINE	Wrist Pin Bushings, Solder From Cooler Core Joints
TRANSMISSION	Needle Bearings (Traces), Solder From Oil Cooler Core Joints
HYDRAULIC SYSTEM	Solder, Trace Element
GEAR SYSTEM	Not Found
COMPRESSORS	Solder, Trace Element
TURBINE	Solder, Trace Element

CADMIUM

ENGINE	Environmental Contaminant
TRANSMISSION	Alloy Metal, Environmental Contaminant
HYDRAULIC SYSTEM	Alloy from Bearings, Environmental Contaminant
GEAR SYSTEM	Alloy Metal, Environmental Contaminant
COMPRESSORS	Alloy Metal, Environmental Contaminant
TURBINE	Alloy Metal, Environmental Contaminant

VANADIUM

ENGINE	Alloy Metal, Contaminant in Marine Bunker Fuels
TRANSMISSION	NOT FOUND
HYDRAULIC SYSTEM	Alloy Metal
GEAR SYSTEM	NOT FOUND
COMPRESSORS	Alloy Metal
TURBINE	Alloy Metal

TITANIUM

ENGINE	Valves, Piston Pins, Bearings, Shafts
TRANSMISSION	Shafts, Gears, Bearings, Paint or Coatings
HYDRAULIC SYSTEM	Valves, Piston Pins, Bearings, Shafts
GEAR SYSTEM	Shafts, Gears, Bearings, Paint or Coatings
COMPRESSORS	Shafts, Gears, Bearings, Paint or Coatings
TURBINE	Shafts, Gears, Bearings, Paint or Coatings

CONTAMINANT/ADDITIVE METALS SOURCE



CONTAMINANT METALS

SILICON

ENGINE	Anti-Foam Additive, Ingested Dirt, Coolant Leak, Silicates from Antifreeze
TRANSMISSION	Disc Lining, Brake Shoes, Ingested Dirt, Silicates from Antifreeze
HYDRAULIC SYSTEM	Ingested Dirt, Elastomeric Seals, Silicates from Antifreeze
GEAR SYSTEM	Ingested Dirt, Silicone Sealant, Anti-Foam Additive, Silicates from Antifreeze
COMPRESSORS	Ingested Dirt, Silicone Sealant, Silicates from Antifreeze
TURBINE	Ingested Dirt, Silicone Sealant, Defoamant Additive, Silicates from Antifreeze

SODIUM

ENGINE	Pistons, Piston Rings, Roller / Taper, Bearings, Cylinder Liners, Exhaust Valves, Water Treatment
TRANSMISSION	Roller / Taper, Bearings, Water Treatment (Oil Cooler)
HYDRAULIC SYSTEM	Rods, Spools, Roller / Taper, Bearings
GEAR SYSTEM	Roller / Taper, Bearings
COMPRESSORS	Rings, Roller / Taper, Bearings, Water Treatment (Oil Cooler)
TURBINE	Shafts, Bearings

POTASSIUM

ENGINE	Anti-Freeze, Solder Flux, Head Coatings, Pot-Ash
TRANSMISSION	Anti-Freeze, Solder Flux, Head Coatings, Pot-Ash
HYDRAULIC SYSTEM	Airbourne Environmental Contaminant, Anti-Freeze, Solder Flux
GEAR SYSTEM	Additive from Potassium or, Sodium Borate Gear Oil, Environmental Contaminant, Solder Flux
COMPRESSORS	Airbourne Environmental Contaminant, Anti-Freeze, Solder Flux, Gas Contaminant
TURBINE	Airbourne Environmental Contaminant, Anti-Freeze, Solder Flux, Gas Contaminant

MANGANESE

ENGINE	Steel Alloy Metal in Gears, Some Shafts
TRANSMISSION	Steel Alloy Metal in Gears, Some Shafts
HYDRAULIC SYSTEM	Steel Alloy Metal in Gears, Some Shafts, Bearings
GEAR SYSTEM	Steel Alloy Metal in Gears, Some Shafts, Bearings
COMPRESSORS	Steel Alloy Metal in Gears, Some Shafts, Bearings
TURBINE	Steel Alloy Metal in Gears, Some Shafts, Bearings

ADDITIVE METALS

BORON

ENGINE	Additive common in Engine Oils and, Gear Oils, Indicates Coolant Leak
TRANSMISSION	
HYDRAULIC SYSTEM	
GEAR SYSTEM	
COMPRESSORS	
TURBINE	

MAGNESIUM

ENGINE	Detergent / Dispersant Additive, Alloy Element in Steels, Environmental Contaminant
TRANSMISSION	
HYDRAULIC SYSTEM	
GEAR SYSTEM	
COMPRESSORS	
TURBINE	

CALCIUM

ENGINE	Detergent / Dispersant Additive, Calcium from Water Contamination, Alkaline Reserve Additive
TRANSMISSION	
HYDRAULIC SYSTEM	
GEAR SYSTEM	
COMPRESSORS	
TURBINE	

BARIUM

ENGINE	Not Found, Contaminant in Drilling Applications
TRANSMISSION	Demulsifying Agent in some, Transmission Oils, Contaminant in Drilling Applications
HYDRAULIC SYSTEM	
GEAR SYSTEM	
COMPRESSORS	Demulsifying Agent, Contaminant in Drilling Applications, Additive common in Compressor, Oils and some Transmission, Fluids and Gear Oils
TURBINE	

PHOSPHORUS

ENGINE	Anti-Wear Additive ZDDP, (Zinc Dialkyl-DithioPhosphate), Phosphate Ester, Phosphate Inhibitor found in Coolants
TRANSMISSION	
HYDRAULIC SYSTEM	
GEAR SYSTEM	
COMPRESSORS	EP Additive, Anti-Wear Additive ZDDP, (Zinc Dialkyl-Dithio Phosphate), Phosphate Ester, Phosphate Inhibitor found in Coolants
TURBINE	Coolants

ZINC

ENGINE	Alloy in Brass, Anti-Wear Additive ZDDP, (Zinc Dialkyl-DithioPhosphate), Galvanized Steel from Filter Cannisters
TRANSMISSION	
HYDRAULIC SYSTEM	
GEAR SYSTEM	
COMPRESSORS	
TURBINE	