

TRACE METALS IN PHOSPHATE ESTER CONTROL FLUIDS

Element	Possible sources	
Aluminium	Al	Desiccants and purification media such as Selexsorb and activated alumina. Also pistons, bearings, airborne dirt, casting sand, pumps and some grease thickeners.
Boron	B	Dispersants, buffers and cleaners.
Calcium	Ca	Component of fuller's earth but also detergents in motor oils or cleaners.
Chromium	Cr	Present at 5-8 ppm as an artefact of ICP spectroscopy but also from metal plating, rings, bearings, coolants, gears or wear, weld splatter or grinding dust from stainless steel.
Copper	Cu	Coolers, bearings, bushings, thrust bearings or thrust washers. Also bronze components if these were used in valves or the like.
Iron - steel	Fe	Wear or corrosion of pump or valves or filter parts or bodies. Can include servo-valve spools and bodies. Also fuller's earth. Piping and reservoirs are stainless steel so these are less likely as a source.
Magnesium	Mg	Component of fuller's earth and or some motor oil detergent additives.
Phosphorous	P	A basic component of phosphate esters. Should be >10,000 ppm.
Sodium	Na	Component of some purification media such as molecular sieves, Selexsorb and activated alumina. Also, salt water, coolant additive, soda soap grease, road salt or sweat.
Nickel	Ni	
Lead	Pb	Gear plating, s/s, valves and guides, ring lands, shafts or bearings.
Silicon	Si	Bearings, thrust washers, older greases, paints and gasoline, and lead based solder.
Tin	Sn	Dirt, sand or fly ash, antifoam additives, silicon bronze bearing, pump silicon carbide mechanical seals, desiccants or silicone elastomers.
Zinc	Zn	Babbitted bearings, solder, coolers or corrosion protective coatings.
		Plating on parts i.e. filter endcaps, oil or grease additive (ZDDP), bearings, brass, neoprene seals, white grease and some paints. Also can be an artefact of ICP detection of phosphorous.

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