

Six Factors Affecting the Life of a Lubricant

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Factor	What is it?	How is it threatening?	What do I look for?
Oxidation	The chemical combination of oil or grease with oxygen.	Oxidation is the most limiting factors to a lubricant's useful life. Oil possibly may gel and become unpumpable, and eventually cause severe wear and seizure. Varnish and sludge (polymerized products) increase oil viscosity decrease viscosity index, reduce heat transfer abilities, block oils ways and promote foaming and emulsification.	Severely oxidized oils tend to become very viscous at low temperatures. Volatile and non-volatile acids attack white-metal bearings, can be water soluble and are more aggressive when the lubricant is wet. Sludge, varnish, emulsification, poor air release.
Thermal Degradation	Cracking at high temperatures, in the absence of oxygen.	Safety hazard due to lowered flash points of the oil. Rapidly forming deposits on metal surfaces are not able to function as lubricants.	Thermally degraded oils form carbonaceous residues and volatile gases. Heat built-up.

Contamination	Most common contaminants of oils or greases are: water, fluid-soluble materials, fluid-insoluble materials erroneous fluid additives and fluid degradation.	First of all, contamination is the most common cause of oil failure or rejection. It affects aeration, foaming, air release and demulsibility.	Aeration can cause reduced compressibility of hydraulic fluids; reduced volumetric efficiency of hydraulic system pumps; loss of power transmission efficiency cavitation damage in pump suctions and servo-valves; inadequate response times for turbine over-speed systems; localized oil oxidation in highly loaded regions; interference to oil flow through filters.
Foaming	The action of frothy bubbles being foamed in the fluid due to excess air.	Foam is not a good lubricant. Air or oil foam can accumulate in the headspace of reservoirs, gearboxes, crankcases, sumps and other components with vapor space.	Excessive foam may be forced out of the reservoir through the breather cap. May be ingested to the circulation pump. May interfere with the effective lubrication of gears and bearings.
Air Release	Letting air out of bubbles in the oil. This should occur quickly.	Significantly affected by oil viscosity and temperature. Poor air release can contribute to oil foaming.	High oil viscosity. Low oil temperature. Contamination by diesel engine oils, greases and corrosion preventives. Presence of rust particles. Contact with very hard water.
Demulsibility	The ability to release or shed water.	Undesirable if water is not separating rapidly from the oil (especially in turbine and gear oils or hydraulic fluids).	Poor oil or grease demulsibility can cause corrosion of ferrous metals, significant reduction in the fatigue life of ball bearing, roller bearings and gears and the removal of rust inhibitors and some anti-wear and lubricity additives from oils.