

Additives: What Are They & Where Do They Go?

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This passage comes from Dr. E.C. Fitch's book "Fluid Contamination Control",

"An additive is a compound that enhances property, or imparts some new property to a base fluid. In this way, a base stock that cannot meet operational requirements of a tribological fluid system can be modified through additives".

The more important types of additives are:

Anti-oxidants

Anti-wear additives

Corrosion inhibitors

Viscosity index improvers

Foam suppressants

Anti-oxidants prolong the induction period of base oil in the presence of oxidizing conditions and catalyst metals at elevated temperatures. The additive is consumed and degradation products increase not only with increasing and sustained temperature, but also with increase in mechanical agitation or turbulence and contamination air, water, metallic particles and dust.

Anti-wear additives improve the service life of elements operating in a boundary lubrication regime. Antiwear compounds (ZDDP and TCP) start decomposing at 90 to 100 degrees C and even at lower temperature is water (25 to 50ppm) is present. With 0.005 to 0.2 % volume water in the oil, hydrolysis causes the additive to be leashed out, resulting in the rapid breakdown and acidification of the fluid.

Corrosion inhibitors help prevent metal corrosion due to water contamination and elevated temperatures and also prevent metals from acting as oxidation catalysts. As operating temperature increases, desorption from the metals surface increases and finally reaches a point where the additive is not effective. Wear processes, leaving areas vulnerable to corrosion, can rupture adsorbed monolayers on metal. Also water can result in the leaching of the monomolecular layer from the metal surface and even the inhibitor from the fluid itself.

For more information on Fluid Contamination Control, check out the book written by Dr. E.C. Fitch.