CHAMPION ®
HI-TECH®LUBRICANTS

TECHNICAL BULLETIN

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SUBJECT: ANTI-WEAR ADDITIVES

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IMPORTANT INFORMATION ON ANTI-WEAR ADDITIVES

Zinc dialkyldithiophosphates or ZDDPs may be the most well-known oil additives found in any lubricating oil. In much the same way that aspirin cures many ailments, ZDDPs provide many benefits to lubricating oils, especially engine oils. This class of additives delivers the anti-wear film necessary to protect metal parts under mixed lubrication where metal-to metal contact can occur. They function by adhering to the metal in the engine and are activated as metal-to-metal contact causes temperatures and pressures to rise. The result is a smooth, glass-like surface that provides excellent protection of metal components.

ZDDPs are also excellent anti-oxidants and work synergistically with hindered phenolic and other anti-oxidants found in engine oils. They can work by decomposing peroxides or by cleaning up free-radicals.

Both of these properties, along with their stability are dependent on many factors, and all ZDDPs are not created equal. Different structures activate at differing temperatures and pressures, some are more stable than others.
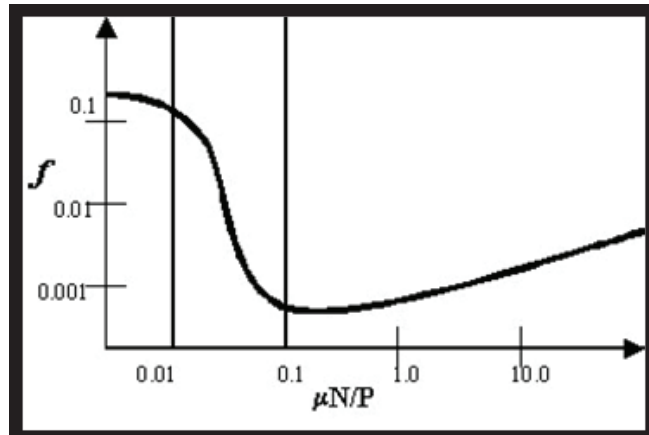

Figure 1 – Stribeck Curve. From left to right are boundary lubrication, mixed lubrication, and full-film lubrication

See the Stribeck Curve (Figure 1) above. It is important that engine oils protect engines in all three lubricant situations – boundary, mixed, and fill-film. This is why it is important to have extreme-pressure agents like molybdenum, and multiple ZDDPs that protect against scuffing through the entire spectrum of pressures and temperatures that an engine may experience.

Champion engine oils contain a cocktail of anti-wear additives that protect your engine under ALL conditions and are more stable to heat and water than oils with only one type of ZDDP anti-wear additive.

Reviewed by __AD__   Approved by __KD__   Revision No. __1__