TEXALENE® Lubricant Additives for improved Thermal Stability and Cleanliness

Two of the fluid properties that can be influenced by TEXALENE® additives are lubricity and corrosion inhibition.

In order to quantify the potential of these additives as lubricity enhancing and corrosion inhibiting additives, two techniques were used. For lubricity enhancement of liquid lubricants, e.g., hydraulic fluids or turbine lubricants, a reciprocating tribometer was used. In this test, a one milliliter sample was placed on a 52100-steel disc and a 52100 steel ball was cycled at 60 Hz under a variety of loads for one hour. For lubricity enhancement of greases, a thin film of grease was applied to the disc. The coefficient of friction was monitored during the test and the wear scar on the disc was measured. The performance of the formulation was compared to the performance of the unformulated product. For corrosion inhibition, 1010 steel panels which had been treated with the formulations were exposed for one hour in a refluxing acidic environment. The corrosion inhibiting performance was compared to the performance of two panels that were exposed to the same environment. One panel was treated with a sample of the unformulated fluid and the other panel was treated with a known excellent rust inhibited product. Remarkable improvement was observed in both lubricity and rust inhibition. Thermal stability up to 204˚C (399°F) was found in the formulations evaluated.

Bercen has developed a line of transportation additives under the TEXALENE® brand that offer promise for hydraulic fluids, greases, and potentially other lubricant additives. These materials have low or no acid number but still possess an excellent combination of anti-wear and anti-rust properties. Currently many hydraulic fluids do not use an antirust additive because most available antirust additives have thermal stability limitations. The hydraulic fluids that use antirust additives most often use metallic sulfonates that are limited to about 225˚F (107˚C). Thermal decomposition of these additives is accompanied by a precipitation that can gum up and clog filters and also lead to sticking valves, which are critical to the hydraulic system operation. Also, in their intended function to tie up water, metal sulfonates work by forming micelles surrounding the water. This mechanism is very effective with small amounts of water. However, if too much water is present, again a precipitate forms with the same consequences as thermal decomposition, namely gum formation deposits on filters and valves. No gumming was found in the post-test thermal stability test fluids with the TEXALENE® additive formulations.

Evaluation of these additives at their most effective concentration, either 1% or 2% by weight, in a polyalphaolefin-based military hydraulic fluid, MIL-PRF-87257, resulted in improved antiwear protection in a reciprocating tribometer test from 32% improvement for TEXALENE® 6256 to 56% improvement for TEXALENE® 6316 compared to the MIL-PRF-87257, which already contains a triarylphosphate. In a corrosion test, excellent antirust protection was also found in these formulations compared to the MIL-PRF-87257 alone.

Through the use of Bercen's innovative TEXALENE® derivatives, a lubricant formulator can inhibit corrosion and through the same additive contribute additional anti-wear performance over the service life of the fluid or grease.

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Texalene