

Influence of Nanoparticles Dispersion in POE Oils on Lubricity and R134a Solubility

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The selection of the optimal commercial oil to be used in a refrigerating system is one of the main problems to be solved for a proper operation of the compressor. The oil must match several requirements to ensure a good solubility with the refrigerant, high compatibility with the materials, proper viscosity, adequate tribological properties etc. Nanotechnologies offer the opportunity to improve the characteristics of the oil and the oil-refrigerant mixture by dispersing nanoparticles in the oil. However, the behaviour of the nano-oil is influenced by several features of the nanoparticles, such as material, size, amount, shape etc., and very few studies are available in the literature at the moment. Here, a study of the influence of the dispersion of single-wall carbon nanohorns (SWCNH) and titanium dioxide (TiO₂) on the tribological properties of a commercial POE oil is presented, together with the effect on the solubility of R134a at different temperatures.