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## *Use of refrigerant with nano particles in vapour compression refrigeration system*

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## **Abstract:**

Thermal conductivity plays essential role in heat transfer event. The conventional refrigerants used in the vapour compression refrigeration system are having small thermal conductivity. To raise thermal conductivity of these refrigerants and hence the heat transfer rate, Nano fluids are the topic of research by a number of the researchers. This paper investigate the reliability and performance of Vapour Compression Refrigeration System using carbon black nano powder mix with Polyolester (POE) oil / Mineral oil (MO) as nano lubricant and R134a refrigerant. POE Oil / Mineral Oil are mix with carbon black nano powder by ultrasonic sonication and stirring process to prepare the nano lubricants. These nano lubricants were use in the compressor of R134a refrigeration system instead of Polyolester (POE) oil. An research was done on the compatibility of POE/Mineral oil mixed with carbon nano black powder (at a concentration of 0.1 and 0.2 gram / liter) as nano lubricant and R-134a refrigerant. To perform this investigation, an experimental setup was designed and fabricated in the lab. The refrigeration system performance with the nano lubricant was investigate by using energy consumption and refrigeration effect investigation. The results indicate that R-134a and POE/Mineral oil with carbon black nano powder works normally and safely in the refrigeration system. The refrigeration system performance was superior to the conventional R-134a and POE oil system. Thus the above nano lubricants can be used in refrigeration system to considerably diminish energy consumption and improved Coefficient of Performance (COP).

## **Keywords:**

Thermal conductivity; Heat transfer; Refrigeration systems; Carbon black nano powder; Nanolubricant; COP; Mineral oil; POE oil; R134a refrigerant;