

**THEME: LUBRICATION**

**AVOID MIXING PAG WITH UNIVERSAL OILS**

**i BACKGROUND**

PAG oil is the most common lubricant applied in modern automotive air conditioning systems running on R134A and R1234yf. It is a fully synthetic oil, offers efficient and universal lubricating parameters, is conductive, highly hygroscopic, and can be offered in several viscosity versions (46/100/150).

AC compressor manufacturers specify the precise lubricant type and quantity required for a proper operation of their compressor pump. The advanced mechanical construction, moving components, and operation in high temperatures and pressures, require an excellent-matched lubrication to ensure proper functionality and long vitality.

**i PROBLEM**

A common reason for AC Compressor failure is applying oil different from the lubricant recommended by the compressor manufacturer. For instance by filling up the system, where the originally applied PAG oil (Poly Alkylene Glycol) is mixed with a universal PAO oil (Poly Alphaolefins Oil) with viscosity parameter 68. Although in general, the PAO and PAG characteristics seem be similar, their viscosity parameter is different. Applying an oil of a different viscosity than required by the compressor producer can lead to compressor serious failures, which, in most cases, will lead to a claim rejection.

**+ RECOMMENDED SOLUTION**

Always follow the compressor or car manufacturer guidelines for the right selection of the lubricant for the AC compressor.

Nissens compressors are always delivered with a warranty and installation guide book describing the proper installation procedure.

Furthermore, Nissens compressors are always pre-filled with the right quantity and viscosity PAG oil and there is therefore no need to add any extra oil. Nissens applies solely a high quality double end-capped PAG lubricant. A double end-capped PAG oil is chemically inactive and stable, offering exceptionally good lubrication characteristics, high moisture tolerance at high temperatures, and does not react chemically to form harmful acids/compounds.

**WHY AVOID MIXING PAG WITH UNIVERSAL OILS?**



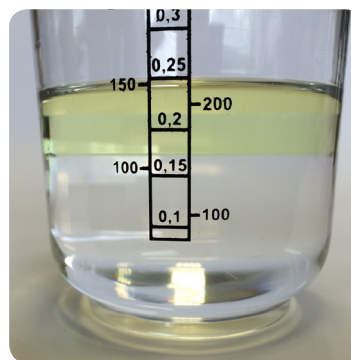
The two oils do not mix completely and cannot create a long lasting homogenous mixture to ensure a proper lubrication of the compressor mechanical parts. Initially, mixed oils will visually seem well-mixed. However, after a short period of time, when compressor is not running, the two oils will separate again.



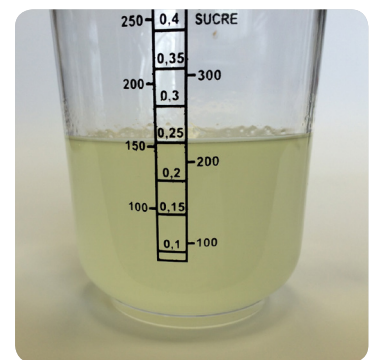
When compressor starts from cold, separated oil of higher density and viscosity will lead to a restricted lubrication of precisely fixed moving elements inside the AC compressor, for example between the piston and cylinder. As the more viscous oil or the oils mixture will not penetrate the moving parts precisely, friction will cause the compressors to overheat and seize.



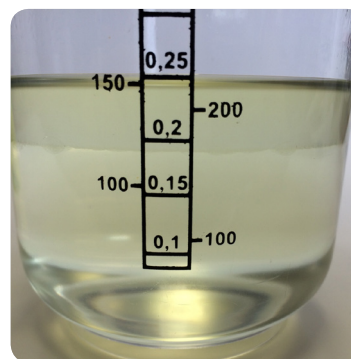
Universal oils do not mix the same way with the refrigerant as the PAG oil, thus the lubricant circulation in the system may be restricted exposing the compressor components to friction and the system other components such as expansion valve or seals to fail.



PAO oil (top) and PAG oil (bottom) poured into a vessel



PAO and PAG oils mixed



PAO oil (top) and PAG oil (bottom) separated after one hour

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