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Using PAO 68 air conditioning compressor oil

A common question when working on air conditioning systems is which air conditioning compressor oil to choose.

Different compressor oils are generally used depending on the application, vehicle manufacturer, and refrigerant. That's why the same questions come up time and again following repair and maintenance work on air conditioning systems: which oil should I use, and how much?

Comparison of compressor oils

PAG oil is a fully synthetic oil that's used ex works by many manufacturers. It's available in various viscosities (PAG/PAG-YF ISO 46, 100, and 150) for R134a and R1234yf refrigerants. The disadvantage of PAG oils is that they are hygroscopic, which means that they absorb and bind moisture from the ambient air. As a result, cans and oil containers don't have a long shelf life once opened.

POE oil is an ester-based oil with an electrically insulating effect. That's why it's mainly used in electric air conditioning compressors in hybrid and electric vehicles. POE oil is also hygroscopic, which shortens the shelf life of containers once opened. The insulating properties of the oil reduce as the water content rises, increasing the potential danger of a short circuit in the compressor.

PAO 68, a fully synthetic multigrade oil, is a good alternative to PAG and POE oils. Because it doesn't absorb moisture, it's also available in larger containers that can be stored almost indefinitely once opened. PAO 68 and PAO 68 Plus UV (with contrast agent) can be mixed with or replace many other lubricants and refrigerants. PAO 68 without contrast agent can also be used with R1234yf refrigerant and in electric air conditioning compressors.

Important!

After performing repairs to the air conditioning system, you must also determine the correct oil filling quantity. It's essential that you take the vehicle manufacturer's specifications and filling quantities into account. Information on the filling quantities for the most common vehicle types is available online in the **MAHLE filling quantities manual**¹. Further information can be found in the **"A/C compressor oil: PAG and PAO oils"** brochure² and in **Technical Messenger, Issue no. 04/2021**³.



Figure 1: PAO 68 multigrade oil with and without UV leak detecting agent



Figure 2: PAG oils



Figure 3: An R134a compressor filled with PAG 46 oil can also be topped off with PAO 68.

Link 1: <https://www.mahle-aftermarket.com/eu/en/services/filling-quantities/>
 Link 2: <https://www.mahle-aftermarket.com/eu/en/media-center/engine-cooling-&-air-conditioning/>
 Link 3: <https://www.mahle-aftermarket.com/eu/en/services/technical-messenger/>