

## Technical Bulletin

### Frequently Asked Questions Related to A/C Lubricants

Question: Why are there so many A/C lubricants on the market?

Answer: When the Montreal Protocol was adopted, the directive was given to stop the manufacture of R-12 and migrate towards the use of more ozone friendly refrigerants like R-134a. Consequently, there were several different opinions regarding which A/C lubricant was the best for use with R-134a. As a result, these opinions translated into new marketing and sales opportunities for many companies.

Question: Which A/C lubricants should I stock and use when there are so many available?

Answer: A clear decision needs to be made regarding the "quality" of lubricants that you stock and install. While the motor oil companies follow the stringent guidelines of SAE, there are no such standards available for A/C lubricants. The A/C lubricants available on the market today differ greatly in terms of the following:

- quality of base materials used for manufacture
- purity of the end product
- miscibility of the A/C lubricant with R-134a refrigerant
- solubility with other A/C lubricants
- OEM approvals from vehicle and compressor manufacturers

Castrol's A/C lubricants are manufactured using the highest quality base stocks and additives. The technical testing that has been done ensures that Castrol A/C lubricants are totally functional in an R-134a system meaning that the A/C lubricant is miscible with the R-134a. The quality of Castrol A/C lubricants is manifested by the approvals from OEMs that are on file.

There are many other A/C lubricants available from no-name suppliers. Castrol has tested several of these products for basic lubricant performance and has found that many of them do not provide the needed lubricity for long-life or they are not miscible with R-134a refrigerant. Castrol's philosophy, and an old cliché from Fram, "pay me now or pay me later" ... pay up front for a strong brand and a quality product.

Question: Should I use a single or double end cap PAG A/C lubricant?

Answer: Most Japanese vehicle and compressor manufacturers specify the use of a double end cap PAG while most domestic vehicle and compressor manufacturers specify the use of a single end cap PAG.

In the end, it is Castrol's opinion that the additional capping of the molecule, from single to double, has no ultimate affect on the wear of the internal compressor components or any other component of the A/C system. The single largest domestic user of components and designer of A/C systems, GM, stands behind their selection and use of single end cap PAG lubricants. In fact, the PAG lubricant used by GM is the same PAG lubricant found in the Castrol bottle. In the end it is a personal preference, but if there is a price difference, why pay for something that isn't proven to be any better?

Question: What viscosity of A/C lubricant should I use?

Answer: The viscosity to use has been determined by the manufacturer of the vehicle or compressor. You must consult the service manual or specification guide for that vehicle/compressor model to determine the correct lubricant and viscosity to be used.

Question: What type of A/C lubricant should I use, Ester or PAG?

Answer: Each vehicle and system was designed with a specific lubricant in mind.

If you are retrofitting an R-12 vehicle, an Ester lubricant should be used as the replacement for the mineral oil. The Ester lubricant is miscible with the R-134a refrigerant while also being soluble with residual amounts of mineral oil ... that is the Ester lubricant blends with any left over mineral oil.

If you are servicing a vehicle that originally has R-134a as its refrigerant, a PAG lubricant will be necessary. Consult the vehicle's service manual for specific viscosity and quantity information.

Question: What A/C lubricant can be used to top-off a system that just needs a small amount of refrigerant?

Answer: Again, this depends on the vehicle, whether or not it is a retrofit (conversion to R-134a from R-12) or if it is originally equipped with R-134a.

If it is a retrofit, Castrol suggests topping of the system with Castrol Ester Oil Charge. If the vehicle was originally equipped with R-134a refrigerant, Castrol suggests using Castrol PAG Oil Charge, which contains a mid-viscosity PAG lubricant.

Question: Is there a "universal" A/C lubricant that can be used for any application?

Answer: No. Some individuals will advocate using one A/C lubricant for all applications and refrigerants. In fact, some suppliers make similar claims. Castrol recommends the following:

- If R-12 is the refrigerant, use mineral oil
- If the vehicle has been retrofitted to R-134a, use Ester

- If the vehicle was originally equipped with R-134a, use the OE specified viscosity PAG lubricant

When a claim is made by a supplier of A/C lubricants that one universal A/C lubricant may be used for every application, the A/C lubricant offered will usually work best for one situation, but not nearly as well for others.

Question: Can I mix A/C lubricants if I do not have enough of one product or the other?

Answer: Castrol does not recommend mixing the various lubricants. If you are in doubt as to what may be in the vehicle's system, you can flush out as much of the lubricant as possible and replace it with the OE specified A/C lubricant. Or, you can put in the OE specified A/C lubricant without flushing.

Question: Do I need to use a certain brand of A/C lubricant, such as those promoted by GM, Ford, Nippondenso, Sanden, etc?

Answer: No. Use a high quality, known brand of A/C lubricant. In most cases, the OE A/C lubricant is the same exact product as that found in the bottles of the top aftermarket brands, such as Castrol.

Question: What effect does residual amounts of flush being left in the system have on the ability of the A/C lubricant to provide adequate lubrication for the compressor?

Answer: This question is best answered by asking more questions. For starters, was a lubricant-based flush used or a solvent-based flush? Also, how much flush was left in the A/C system? If it was a lubricant-based flush and a small amount of flush was left in the system, the answer is easy. Any residual flush will be soluble with the A/C lubricant that will be introduced and adequate lubrication for the compressor should not be compromised. If the flush was a solvent-based product, it is important to follow instructions and remove as much as possible by thoroughly purging and evacuating the A/C system. In both cases though, it is important to remove as much flush material as possible to prevent unwanted reduction of lubricant viscosity or heat exchange capabilities.

Question: How can I determine whether or not a system or component failed due to a lubricant related issue?

Answer: Other than the obvious situation of no A/C lubricant being added to the system at the time of the repair, it is very difficult to know for sure. It is generally best to leave the actual analysis up to the component manufacturer. While the manufacturer has the ability to do an in depth analysis, the technicians part is to do the job right the first time. Be sure to find the cause of the problem before the system is repaired. Flush the system and replace components that cannot adequately be cleaned by flushing. Always use the specified A/C lubricant type and viscosity supplied by a high quality, known manufacturer offering OE approvals on their A/C lubricants. Doing the job a second time is a no-win situation for everyone.