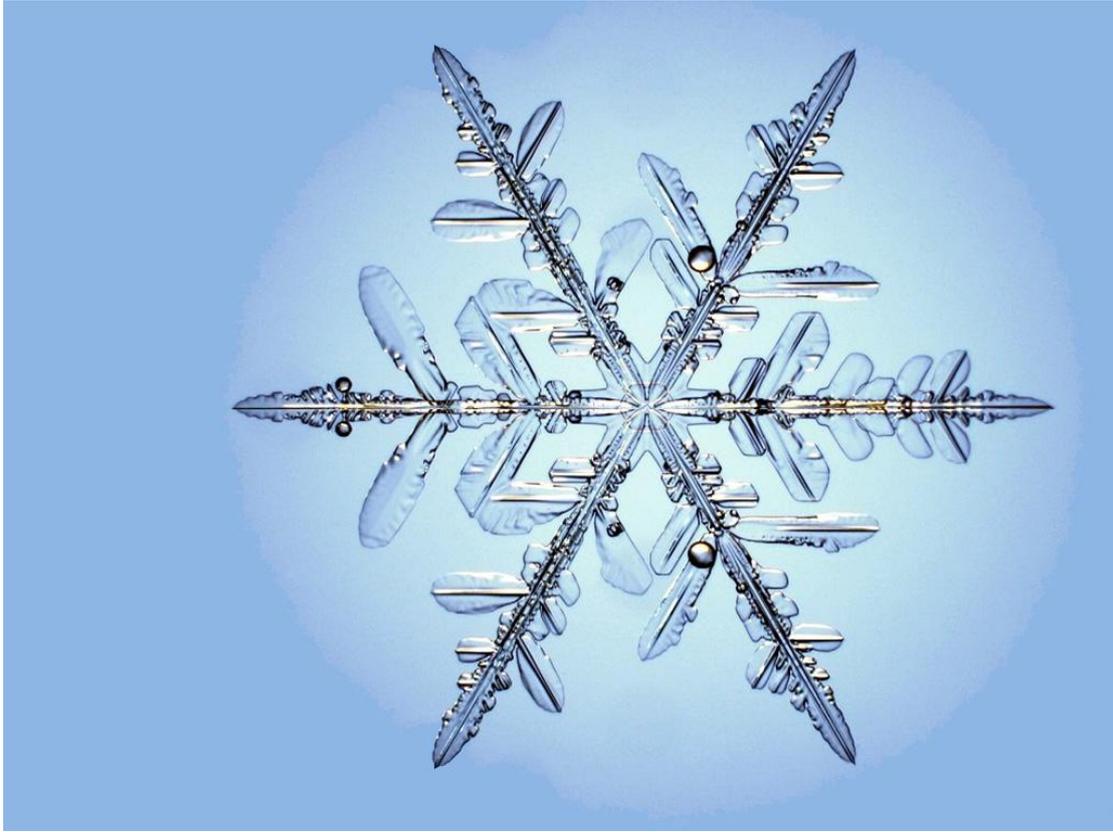


The cool facts regarding R1234yf



Since the refrigerant R12 was banned, R-134a has been the refrigerant of choice for air conditioning systems used in motor vehicles or as the EU calls them - Mobile Air Conditioning systems (MACs). This is due to R-134a's good thermodynamic properties, its worldwide availability and relatively low cost.

However, its contribution to global warming is now considered to be unacceptable and in 2006, the EU formulated the legislation 2006/40/EC (F-Gas) to ban the use of greenhouse gases having a Global Warming Potential (GWP) of more than 150 ... since R-134a has a GWP of greater than 1300, the European directive thus banned the use of R-134a from January 1st 2011 for all new vehicle model types introduced and for all new vehicles sold from January 1st 2017.

The automotive industry has responded by identifying two materials that would comply with the European Union GWP requirement and offer acceptable refrigeration performance namely:

R-744, (CO₂) which has a GWP of 1

R-1234yf, which has a GWP of 4

R1234yf

In certain concentrations, both products could lead to a safety hazard to the vehicle occupants and/or to **a technician required to service the vehicle**, so which refrigerant will be adopted?

R-744 has a lot going for it, with a GWP of only 1 it's basically Co₂, so is part of the human respiratory process and no recycling is required. However, the operating pressures would need to be very high, resulting in the air-con system requiring a complete redesign and because Co₂ is already in the atmosphere, leaks would be difficult to find and a leak into the passenger compartment could be lethal.

R-1234yf, which is Hydro-Floro-Olefin 2,2,2,3 Tetrafluoropropene has a GWP of 4, but is very similar to R-134a so requires very little changes to current system designs. Although the product is classified slightly flammable by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), several years of testing by the SAE proved that the product could not be ignited under conditions normally experienced in a vehicle. In addition several independent authorities evaluated the safety of the product in vehicles and all concluded that it was as safe to use as R134a.

R-1234yf appears to be the first choice of European vehicle manufacturers; therefore we have listed a few key points below:

- The current R134A PAG oils will not work with R1234yf, so you will need to keep them separated.
- R1234yf can be recycled in the same way that R134A has been in the past, but the service equipment needs to be manufactured to a different standard
- Garages will require new RRR service equipment and will need to use it alongside their R134a equipment.
- Leak detection equipment that meets the current standard will work with R1234yf
- Service ports are similar to R134A, however they are smaller in size to prevent misuse.

So if you service mobile air conditioning you will need to purchase new service equipment eventually, but the introduction of R1234yf will be slow. The regulation only calls for new car models that are introduced into the market to be using it by 1.1 2011 and all new vehicles by 2017. Furthermore, due to limited refrigerant production vehicle manufacturers are finding it difficult to obtain. Honeywell and DuPont announced that they will jointly build a manufacturing facility to produce R1234yf and the new plant will be ready to supply commercial quantities of 1234yf later this year.

Recent estimates show that it will be at least 10 years before we see 50% of the car park being of vehicles using R1234yf, so unless you deal with a vast proportion of new cars or specialise purely in servicing MACs, there's little need to rush out and buy a new R1234yf service unit this year. Most garages will more than likely purchase at least another two R134a units before we see the refrigerant's complete disappearance. However, 2 - 3 years from now,

R1234yf

serious MAC workshops will need to run individual equipment that can handle each type of refrigerant.

(Estimated Data)

