



## Choosing the next Refrigerant for Car Air Conditioning

*Aide Mémoire*

### BACKGROUND

In summer 2007, German car manufacturers, grouped under the sector association VDA<sup>1</sup> confirmed that they will use CO<sub>2</sub> (R744) for the next generation vehicle air conditioning. One year after, time is running out for other manufacturers to also choose the next refrigerant for car air conditioning. This is an opportunity to slash global emissions of greenhouse gases by 1%, if a sustainable technology is adopted worldwide.

The chemical (HFC 134a) used today will be phased out from 2011 to 2017, due to its high Global Warming Potential (GWP). Manufacturers can either: follow the German lead, by opting for a natural alternative, recycling carbon dioxide (CO<sub>2</sub>), with the potential to save over 10% of each and every car's total emissions of greenhouse gases to the atmosphere, or opt for a chemical substance, HFO-1234yf, which is flammable, less efficient and has yet to be fully tested. This is the latest of a series of substances proposed by the chemical industry over the last years, all the previous ones having been already rejected by the car industry.

This decision is the tipping point for the introduction of a more advanced and environmentally friendly technology into other sectors, namely supermarkets, vending machines and heat pumps for domestic water and floor heating. A huge amount of emissions can be saved across all these sectors, equal to 3% of the world's total emissions.

### CO<sub>2</sub> - THE BEST OPTION

The natural refrigerant CO<sub>2</sub> (R744 in the official industry nomenclature), is the most environmentally friendly and technically advanced solution for car air conditioning. Experts worldwide have extensively analysed and tested it in a variety of vehicle models and weather conditions over the last 10 years.

Compared to new the chemical substance, experts conclude that CO<sub>2</sub> car air conditioning is:

1. **More environmentally friendly:** CO<sub>2</sub> reduces the direct emissions to zero for a car's cooling system. Since the carbon dioxide used is an industrial by-product, cleaned and recycled, it is actually neutral, storing CO<sub>2</sub> during the life cycle just as a tree does. On top of this, a CO<sub>2</sub>-based system will save the driver money as it consumes less fuel to function in the vast majority of climates (i.e. in over 95% of the driving conditions worldwide). The result: using CO<sub>2</sub> systems can save up to 10% of total emissions from a car.

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<sup>1</sup> The VDA- (Verband der Automobilindustrie) groups all major carmakers in Germany, including Audi, BMW, DaimlerChrysler AG, Porsche, Volkswagen, Ford and Opel.

2. **More technically ready:** CO<sub>2</sub> models have been developed and tested in all climates. They are ready for mass production, unlike the new chemical, which is flammable, potentially toxic, and with unknown environmental long-term consequences. Besides the superior performance in terms of emissions reductions and lower fuel consumption, CO<sub>2</sub> systems are also faster to heat and cool a car, and have a smaller size, which can bring about additional emissions reductions. Overall, it is a safe, reliable technology, with better performance than current and proposed chemical alternatives.
3. **More cost-efficient:** As a refrigerant itself, CO<sub>2</sub> is cheap and widely available. The servicing will also be much cheaper for the consumer, as the systems do not require complicated infrastructure to avoid leakage, as is the case with chemical alternatives. For the industry, the costs of developing the necessary components will be the same for current systems once they enter into mass production. An initial investment from carmakers in the order of 20€ per unit is required. For the consumer, however, the total cost of ownership is lowest with CO<sub>2</sub>.

#### **WHY IS THERE RESISTANCE TO THIS NEW TECHNOLOGY THEN?**

The automotive sector's main concern regarding CO<sub>2</sub> Technology is the additional cost it would represent in the short term to switch to a new system. Since the systems need new components, due to its different properties compared to current ones, the automotive sector needs to make an initial investment that will be recovered over time. The focus on short-term shareholder value is the major hurdle to the implementation of a more advanced technology that represents clear benefits for the industry, the consumers and the planet.

#### **CALL FOR ACTION**

We urge the automotive industry to opt for the only sustainable option in "The Cool War" by;

- **Supporting** the adoption of CO<sub>2</sub> as a global solution for car air conditioning
- **Rejecting** the introduction of unsustainable chemical substances and any further delay in the choice of refrigerant.



**THE ALLIANCE FOR CO<sub>2</sub> SOLUTIONS**

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