Honeywell

Fact Sheet

HFO-1234yf

HFO-1234yf	- Developed for mobile air conditioning in vehicles - Global usage - Environmentally friendly - Comprehensively tested - Reliable - Cost-efficient
HFO	Describes an organic fluorine compound called hydrofluoroolefin
1234	Stands for a specific compound: 1 = double bond 2 = hydrogens 3 = carbons 4 = fluorines
yf	Denominates the specific isomer (position of the fluoro atoms)
MAC Directive	Starting in January 2011, all new vehicle types must have an air conditioning refrigerant with a global warming potential (GWP) below 150. From 2017 on, this will apply to all new vehicles. This is based on the MAC Directive (2006/40/EG), passed in July 2006.
Development	Honeywell and DuPont, in a joint development agreement, have developed HFO-1234yf to replace R-134a, and are currently separately preparing for the commercialization of the product.
Environmental	HFO-1234yf has a GWP of 4. It significantly exceeds the mandate of the MAC Directive (GWP below 150).
Approval	HFO-1234yf is approved for use in Japan, Korea and China. Under the ECE Agreement, HFO-1234yf is thereby also approved in Germany. In the US and in Europe, the approval processes are in their final stages.

	HFO-1234yf is registered under the EU chemical regulation REACH. The US EPA is planning to include HFO-1234yf in their SNAP Program (Significant New Alternatives Policy). With this program, the EPA evaluates new and improved substances that replace ozone-depleting substances.
Adoption	Global adoption for new car models.
Time of Adoption	The first car manufacturers will receive the product according to their orders.
Quantity	About 600 grams in modern air conditioning equipment; refill in automotive lifecycle, if necessary.
Scientific Studies	Honeywell ensures that all products undergo intense testing both internally and externally, especially during the development phase. SAE International – the international Society of Automotive Engineers with about 115,000 engineers and technicians – has tested HFO-1234yf for five years in their Cooperative Research Program. 18 international, independent scientific institutions and 15 international car manufacturers and component suppliers have participated in this program. These industry participants include: Audi, BMW, Chrysler, Daimler, Fiat, Ford/Volvo, GM/Opel, Honda, Porsche, PSA, Renault, Jaguar/Land Rover, Toyota and VW, as well as Conti Tech, Delphi, Denso, DuPont, Freudenberg, Goodyear, Maflow, Valeo and Visteon. SAE has clearly stated that HFO-1234yf is the best available refrigerant for MAC.
Crash Tests	The automotive manufacturers and component suppliers have tested HFO-1234yf in detail during the SAE Cooperative Research Program. They have modern testing facilities and broad experience in conducting these tests. Two examples: Fiat has conducted a crash test with HFO-1234yf with a Fiat 500 at 65 km/h (in accordance with EuroNCAP Protocol). →There was no fire and no excursion of toxic materials. Peugeot has conducted a crash test with HFO-1234yf in a Peugeot 308 at 56 km/h (in accordance to ECE 94). The engine had been running for a long time and was particularly hot. →There was no fire and no excursion of toxic materials.
Safety	The EU differentiates gases into two categories: highly flammable and non-flammable. That is why HFO-1234yf has to be called highly flammable (Directive for Dangerous Substances,

	Nov. 11, 2010 and Directive Nr. 1272/2008). Tests have shown that the product does not ignite on surfaces up to 800 degrees Celsius.