

**International Symposium on Non-CO2 Greenhouse Gases
Wageningen, the Netherlands, June 30 - July 3, 2009
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Low Global Warming Fluorocarbons are safe and environmentally preferable

Honeywell has introduced two new low global warming fluorocarbons, which can replace current R-134a. In a nutshell, they are environmentally acceptable, safe in use, functional and economically viable.

HFO-1234yf is suitable for mobile air conditioning; HFO-1234ze, as the first low GWP fluorocarbon commercially available, can function in foam and aerosol applications. HFO-1234ze can be used in polyurethane foam to replace 134a, because its insulation is 10% better than hydrocarbon blown foam.

Their atmospheric life time is 12 days for HFO 1234yf and 18 days HFO 1234ze. Both products have zero ozone layer depletion potential. The global warming potential of these two fluorocarbons is truly low: HFO 1234yf has 4 and HFO 1234ze 6.

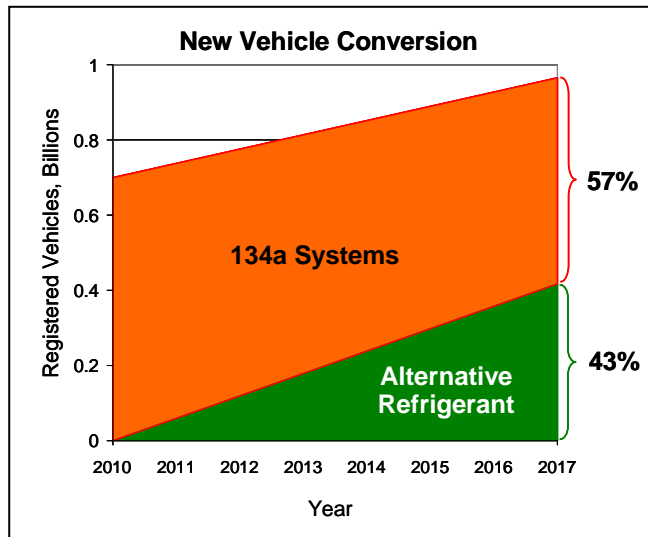
Honeywell undertook several tests on toxicity of both fluorocarbons: for example cardiac sensitization, genetic testing, genomic testing or reproductive toxicity. Results were clear: neither of them has negative influence on human health.

HFO-1234ze is not flammable, while the minimum ignition energy lies between 5,000 and 10,000 mJ for HFO-1234yf. In other words, the flammability risk associated with the use of HFO-1234yf both inside the passenger cabin and in the engine compartment is assessed under what the industry considers worst-case leak scenarios. As an example, a person is 10,000 times more likely to be

struck by lightning than to be injured from an HFO-1234yf ignition resulting from a collision.

Another set of tests was done on life cycle climate performance, where three refrigerants were compared: current R-134a and alternative refrigerants HFO-1234yf and CO2. Tests took into account real life conditions and covered life cycle of the products from cradle to the grave, including service practices, end of life practices, fuel consumption and exhaust emissions for air condition operation. In all tests HFO-1234yf performed better than CO2 in car air conditioning.

Conversion to alternative refrigerants will reduce total global LCCP by 12% or 100 million metric tons CO2. The 2017 134a vehicle fleet represents another 297 million metric tons CO2e savings if it could be retrofitted to 1234yf.



HFO-1234ze was already launched in Europe for one-component foam and aerosol use. HFO-1234yf's commercialization depends on automotive industry's decision. Other low GWP materials are under development.

For all above mentioned reasons, HFO-1234yf is ideal replacement for R-134a in mobile air conditioning systems. Its performance is very similar to R-134a. It is compatible with R-134a components, so it does not require major system changes. Its flammability risk is the lowest in most of the alternative refrigerants for auto air conditioning. Moreover, it is a global solution, as it can perform in all climates and car sizes – contrary to CO2 systems, which's efficiency declines as temperatures increase.