

30 September 2019

EFCTC Response to recent Articles about HFO-1234yf-KEY POINTS BRIEF

EFCTC has, through its newsletter and website¹, already commented in the past on all the points raised in recent articles “Refrigerant R1234yf again in criticism”² and an article about HFOs in the September issue of Accelerate magazine³.

In this Key Points brief EFCTC provides important conclusions about the 4 main issues raised. EFCTC has issued in its October 2019 newsletter a detailed paper, with references to information sources, that addresses the points raised in the articles, and also on the website is a shorter summary. The paper comments in detail on the 4 main issues raised:

Fire Safety and Combustion Products: Safe operation of the refrigerant R-1234yf in MAC systems, has been shown according to the definition of "safe product" in the General Product Safety Directive 2001/95/EC. The appropriate testing showed no ignition of refrigerant R1234yf and no release of hydrogen fluoride (HF) despite the very high temperatures in the engine compartment.

Atmospheric Concentrations: The detection of HFOs in the atmosphere is no different to the detection of other very short lifetime substances such as propane, isobutane, pentane. Background concentrations at end of 2017 for 3 HFOs/HFCOs are less than 0.1 ppt. To put this in context, 1 part per trillion is about the same as 1cm² compared to the area of Paris (105.4 sq km).

Environmental Safety: Over 200 million tonnes of trifluoroacetic acid (TFA as its salts) are present in the oceans, having apparently accumulated over many million years. More than 95% of TFA found in the oceans is naturally formed. A 2018 independent report stated that “There is still no indication that exposure to current and projected concentrations of salts of TFA in surface waters present a risk to the health of humans and the environment. TFA in rainwater is millions of times more dilute than that in industrial solutions and would not cause adverse effects”

Water Solubility of TFA: Amounts deposited in flowing surface water will ultimately accumulate in the oceans and salt lakes where water is lost only by evaporation. Because of their high solubility in water and their very small octanol-water partition coefficient, the salts of TFA do not bioconcentrate in aquatic organisms, and do not biomagnify in the food chain. Thus, they present negligible risk to organisms higher on the food chain, including humans. The projected growth in use of R-1234yf and resulting emissions of TFA is expected to have only a small contribution to the quantities of TFA found in German rivers.

In summary, EFCTC members continue to have full confidence in the use of R-1234yf as a refrigerant for mobile air-conditioning and other applications. The 2018 Scientific Assessment of Ozone Depletion concluded that the current and estimated future concentrations of TFA and its salts resulting from degradation of HCFCs, HFCs, and HFOs do not pose any known significant risk to human or ecosystem health.

¹ See EFCTC LEARN ABOUT TFA For a wide range of information about Trifluoroacetic acid/acetate as a breakdown product of some HFCs and some HFOs [here](#).

² Springer Professional Germany [source](#) and in the DKV online news

³ Accelerate Magazine [source](#)



The European FluoroCarbons Technical Committee is a Cefic Sector Group that monitors legislation related to HFCs (hydrofluorocarbons), and HFOs (hydrofluoro-olefins) in the EU and at global level. Fluorocarbons are used as feedstock, as refrigerants, as solvents and as blowing agents for insulation plastic foams.

Contact: EFCTC Chairman: Dr. N. Campbell, nick.campbell@arkema.com

EFCTC Secretariat: Angelica Candido, anc@cefic.be

