

## ATMOsphere Report Examines Rising Threat of HFOs and TFA to Health and the Environment

The report cites a myriad of studies on the accumulation of HFO-1234yf and TFA in the environment.

BRUSSELS, BELGIUM, October 4, 2022 /EINPresswire.com/ -- ATMOsphere, publisher of R744.com, has published a new report examining the reported evidence that HFO-1234yf, used widely as a refrigerant by itself and in blends, represents a growing threat to human health and the environment via its atmospheric degradation product, trifluoroacetic acid (TFA).

		The Rising Threat of HFOs and TFA to Health and the Environment	
a			Report
	HFOs-TFA report		

The report, "The Rising Threat of HFOs and TFA to Health and the Environment," can be accessed for free <u>here</u>.

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The writing on the wall – in the form of numerous studies cited in this report – steady development of a new environmental and health problems stemming from the use of a fluorinated refrigerant." *Marc Chasserot, Founder of ATMOsphere*  The report cites a myriad of studies have been conducted, mostly in Europe, on the accumulation of HFO-1234yf and TFA in the environment.

The chemical industry's replacement for HFCs – HFOs (hydrofluoroolefins) – have very low GWP values and thus don't present a problem for the climate or the ozone layer. But other environmental and health concerns have arisen for HFOs, particularly for HFO-1234yf, a mildly flammable (A2L) refrigerant that is the most widely used HFO, the report notes.

The largest use of HFO-1234yf, beginning in Europe in 2012, has been as a replacement for R134a (100-year GWP of 1,430) in mobile air conditioning. Moreover, HFO blends such as R513A

and R449A, which include HFO-1234yf as a key ingredient, are used in thousands of stores globally as well as in industrial facilities, ice rinks and other applications.

When HFO-1234yf leaks into the atmosphere, 100% of it photo-oxidizes, in only 10-14 days, into trifluoroacetic acid (TFA), a short-chain per-fluoroalkylcarboxylic acid (scPFCA). TFA then descends in rainfall to Earth, where, as an extremely durable chemical, it accumulates mostly in water bodies, including rivers, streams, lakes and wetlands.

TFA linked to HFO-1234yf emissions

While not currently regulated, TFA is collecting in the environment, according to a number of recent studies, which largely attribute this to expanding emissions of HFO-1234yf, the report points out.

Even at extremely small concentrations in drinking water, TFA is potentially harmful to human health, says the report, adding that it is difficult to remove from drinking water using conventional methods.

In Germany, where a host of TFA studies have been conducted, the German Environment Agency (UBA) has set a human health "orientation value" limit of  $60\mu g/L$  for TFA in drinking water and a "precautionary measure" of 10  $\mu g/L$ . The concentration levels of TFA in the environment have begun to approach – or exceed – those levels in some studies, the report points out.

Long-term exposure to TFA can potentially damage the liver and the thyroid function in humans, according to <u>a report released in 2021</u> by Refolution Industriekälte, a German consulting and engineering firm focused on sustainable refrigeration.

Both TFA and HFO-1234yf fall under the definition of PFAS (per- and polyfluoroalkyl substances) <u>established by the OECD</u> (Organisation for Economic Co-operation and Development) and used by scientists around the world. PFAS encompass a well-known group of chemicals such as PFOA, PFOS and GenX, that have been linked to effects on the immune system and human development, cancer and other adverse health outcomes.

The report points out how the chemical industry – as it has with previous f-gas refrigerants – has defended HFO-1234yf, particularly in regard to the impact of TFA.

## About ATMOsphere

For the past 20 years, market accelerator ATMOsphere (formerly shecco) has been active in helping bring climate-friendly technologies faster to market. ATMOsphere supports over 100 partners worldwide in the HVAC&R sector, where the focus is on sustainable refrigeration, heating & cooling technologies using natural refrigerants.

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