

## LEARN ABOUT...

# HCFO-1233zdE, HBFO-1233xfB, Stratospheric Ozone and Climate Change

Created: January 2018

Updated: May 2018

These are tetrafluorochloropropene (HCFO-1224), chlorotrifluoropropene (HCFO-1233) and bromotrifluoropropene (HBFO-1233). All are oxidised rapidly in the lower atmosphere with atmospheric lifetimes of 21 days<sup>i</sup>, 26 days<sup>ii</sup> and 7 days<sup>iii</sup>, respectively; hence all are very short lived substance (VSLs)<sup>iv</sup> that, in view of their minimal effect on stratospheric ozone, are not listed as Ozone Depleting Substances in the Montreal Protocol.

It takes several months for a substance released in northern temperate regions of the world to be transported through the lower atmosphere before it is injected into the stratosphere. Consequently, very little of these halopropenes can be transported to the ozone layer. In the case of HCFO-1233zd(E), for material emitted between 30° and 60°N, an average Ozone Depletion Potential (ODP) has been calculated to be 0.00034<sup>v</sup> and, on the same basis, that of HBFO-1233xf(B) is 0.0028<sup>vi</sup>. The ODP of HCFO-1224 is reported as 0.00012<sup>1</sup>. Due to their very short atmospheric lifetimes, these substances do not accumulate in the atmosphere and the global warming potentials (GWPs) of all substances are 1 or less than 1<sup>1,5,6</sup> (that is less than carbon dioxide at the 100 year time horizon).

The authors of the papers which reported these data stated that, "The short lifetime, low ODP, and low GWP indicate that [these substances] should have minimal effects on ozone and climate."

---

<sup>i</sup> Measured by the National Institute of Advanced Industrial Science and Technology, Japan (AIST); GWP calculated according to the IPCC AR5 method.

<sup>ii</sup> Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

<sup>iii</sup> Patten, K. O., V. G. Khamaganov, V. L. Orkin, S. L. Baughcum, and D. J. Wuebbles (2011), OH reaction rate constant, IR absorption spectrum, ozone depletion potentials and global warming potentials of 2-bromo-3,3,3-trifluoropropene, *J. Geophys. Res.*, 116, D24307, doi:10.1029/2011JD016518.

<sup>iv</sup> Ko M.K.W. and 32 others, *Very Short-Lived Halogen and Sulphur Substances*, Chapter 2 of *Scientific Assessment of Ozone Depletion: 2002*, Global Ozone Research and Monitoring Project - Report No. 47, World Meteorological Organization, Geneva, 2002.





## LEARN ABOUT...

# HCFO-1233zdE, HBFO-1233xfB, Stratospheric Ozone and Climate Change

Created: January 2018

Updated: May 2018

---

<sup>v</sup> Patten, K. O. and Wuebbles, D. J.: Atmospheric lifetimes and Ozone Depletion Potentials of trans-1-chloro-3,3,3-trifluoropropylene and trans-1,2-dichloroethylene in a three-dimensional model, *Atmos. Chem. Phys.*, 10, 10867-10874, <https://doi.org/10.5194/acp-10-10867-2010>, 2010.

<sup>vi</sup> Patten, K. O., V. G. Khamaganov, V. L. Orkin, S. L. Baughcum, and D. J. Wuebbles (2012), Correction to "OH reaction rate constant, IR absorption spectrum, ozone depletion potentials and global warming potentials of 2-bromo-3,3,3-trifluoropropene," *J. Geophys. Res.*, 117, D22301, doi:10.1029/2012JD019051.

### EFCTC

Avenue E. van Nieuwenhuyse 4 B-1160 Brussels Belgium  
Tel. +32.2.676.72.28 [sga@cefic.be](mailto:sga@cefic.be) [www.fluorocarbons.org](http://www.fluorocarbons.org)

A sector group of Cefic

European Chemical Industry Council - Cefic aisbl

EU Transparency Register n° 64879142323-90

