FACT SHEET

Air Quality: Revision to the Regulatory Definition of Volatile Organic Compounds – Exclusion of \( \textit{cis}-1,1,1,4,4,4\)-hexafluorobut-2-ene (also known as HFO-1336mzz-Z)

**ACTION**

- On April 23, 2018, the U.S. Environmental Protection Agency (EPA) proposed revisions to the regulatory definition of volatile organic compounds (VOC) under the Clean Air Act. This action proposes to add \( \textit{cis}-1,1,1,4,4,4\)-hexafluorobut-2-ene (also known as HFO-1336mzz-Z; CAS RN 692-49-9) to the list of compounds excluded from the regulatory definition of volatile organic compound (VOC) because it makes a negligible contribution to ground-level ozone formation.

- HFO-1336mzz-Z may be used in a variety of applications as a replacement for foam expansion or blowing agents most of which have higher global warming potential (GWP) (>700 GWP) and are used in the production of polyurethane rigid insulating foams. It is also a new developmental refrigerant for use as a potential working fluid for Organic Rankine Cycles (ORC)\(^1\) used to produce energy.

- Some VOCs contribute significantly to the formation of ground-level ozone. Exposure to ozone can cause serious respiratory illness.

- This action is based on consideration of HFO-1336mzz-Z’s negligible contribution to ground-level ozone and the low likelihood of its risk to human health and the environment associated with its use.

- This action proposes to allow, but does not require, states to exclude from control emissions of HFO-1336mzz-Z in State Implementation Plans (SIP) designed to meet the ground-level ozone standards. This enables industry to use HFO-1336mzz-Z with fewer restrictions.

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\(^1\) The Organic Rankine Cycle (ORC) is named for its use of an organic, high molecular mass fluid with a liquid-vapor phase change, or boiling point, occurring at a lower temperature than the water-steam phase change. The fluid allows Rankine cycle heat recovery from lower temperature sources such as biomass combustion, industrial waste heat, geothermal heat, solar ponds etc. The low-temperature heat is converted into useful work, that can itself be converted into electricity.
• This proposed rule will be open for public comment for 60 days after publication in the Federal Register.

BACKGROUND

• A compound may be excluded as a VOC as a result of public petitions and scientific data that demonstrate its negligible effect on the formation of ground-level ozone. Since 1977, EPA has removed 62 specific compounds or classes of compounds from the list of VOCs that contribute to ozone formation.

• DuPont Chemicals & Fluoro-products (DuPont)/Chemours submitted a petition to the EPA on February 4, 2014, requesting that cis-1,1,1,4,4,4-hexafluorobut-2-ene (also known as HFO-1336mzz-Z; CAS RN 692-49-9) be exempted from the regulatory definition of VOC. The petition was based on the argument that HFO-1336mzz-Z has low reactivity relative to ethane.

• EPA has carefully reviewed all available scientific data before proposing to exclude this compound from regulation as a VOC.
  • Due to its low photochemical reactivity, HFO-1336mzz-Z is considered to be negligibly reactive in the formation of ground-level ozone and is not expected to contribute to violations of the national ambient air quality standards (NAAQS).
  • HFO-1336mzz-Z has very low GWP compared to current alternatives.
  • HFO-1336mzz-Z as a foam blowing agent and a refrigerant has a lower stratospheric ozone depletion potential than other alternatives, and based on the available toxicity data, it is less harmful compared with other chemicals used for the same purpose.

FOR MORE INFORMATION

Interested parties can download the action and other materials from EPA’s Web site on the Internet under Recent Actions at the following address: https://www.epa.gov/ozone-pollution/ozone-volatile-organic-compound-voc-exemptions-rules.

• To view the proposed rule and any background information related to the rule (use Docket ID No. EPA-HQ-OAR-2017-0175), go to http://www.regulations.gov.

• EPA’s electronic public docket and comment system at http://www.regulations.gov.

• The EPA Docket Center’s Public Reading Room (for hard copies).
  o The Public Reading Room is located at EPA Headquarters, Room Number 3334 in EPA WJC West Building, 1301 Constitution Avenue, NW, Washington, DC.
Hours of operation are 8:30 a.m. to 4:30 p.m. eastern standard time, Monday through Friday, excluding federal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air and Radiation Docket is (202) 566-1742.

- You will have to show photo identification, pass through a metal detector, and sign the EPA visitor log. Any materials you bring with you will be processed through an X-ray machine as well. You will be provided a badge that must be visible at all times.

- For further information about these actions, contact Souad Benromdhane of EPA’s Office of Air Quality Planning and Standards, at (919) 541-4359 or by e-mail at benromdhane.souad@epa.gov.