



## FLUORINATED GREENHOUSE GASES

<b>Other Names</b>	Not available
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CAS Number	Substance
various	Hydrofluorocarbons (HFCs)
various	Perfluorocarbons (PFCs)
2551-62-4	Sulphur Hexafluoride (SF6)

*List continued in "Additional Information"*

<b>May Be Found In</b>	<ul style="list-style-type: none"><li>• Foam blowing agents</li><li>• Solvents</li><li>• Fire retardants</li><li>• Aerosol propellants</li><li>• Refrigerants</li><li>• Electrical transmission equipment</li></ul>
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**Fluorinated Greenhouse Gases (F Gases)** are a family of chemicals that contribute to climate change and global warming if emitted to the atmosphere. F Gases are comprised primarily of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6). HFCs are relatively short-lived in the atmosphere, while PFCs and SF6 can remain in the atmosphere for thousands of years.<sup>1</sup>

### Uses in the Supply Chain

F Gases have been used as substitutes for ozone-depleting substances. HFCs may be used as foam blowing agents, solvents, fire retardants, aerosol propellants, and refrigerants. PFCs are commonly used within electrical transmission equipment and circuit breakers.<sup>2</sup> A detailed list of production information, F Gas usage, and related information is available.<sup>3</sup>

### Why Fluorinated Greenhouse Gases (F Gases) are Restricted

- Legislation in major markets around the world restricts the presence of F Gases in finished products.
- F Gases have a higher Global Warming Potential (GWP) than carbon dioxide and thus contribute more to global warming. Different greenhouse gases remain in the atmosphere for varying amounts of time. Actions to reduce emissions now will take years to result in changes in the atmosphere.
- Chemical hazard information for many chemicals can be found at the following external databases:
  - GESTIS Substance Database: [Here \(external link\)](#)
  - US National Library of Medicine: [Here \(external link\)](#)
  - US OSHA Occupational Chemical Database: [Here \(external link\)](#)

### Sourcing Compliant Formulations from Your Chemical Suppliers

- For all formulations, request SDS documentation that meets current GHS requirements.
- Discuss with your chemical supplier whether any safer alternatives are available that are suitable substitutes for your production needs.
- Prior to procuring any formulation, the chemical properties must be reviewed to ensure that proper protective equipment, chemical storage facilities, facility engineering controls, and associated treatment/disposal facilities are appropriate for the chemical(s).
- Pay special attention that HFCs are not used as blowing agents in foam production.



## Chemical Information Sheet

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### Safer Alternatives

There are many alternative products and production processes that may be suitable for your production needs that do not use fluorinated greenhouse gases or other substances with a global warming potential. Any chosen alternative must be ZDHC MRSL compliant whenever applicable.<sup>4</sup>

### Additional Information

- Visit ECHA's Candidate List of substances of very high concern to view dossiers for many restricted substances <https://echa.europa.eu/candidate-list-table>.
- United States Environmental Protection Agency Greenhouse Gas Emissions – <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>
- European Commission Climate Action – Fluorinated Greenhouse Gases – [https://ec.europa.eu/clima/policies/f-gas\\_en](https://ec.europa.eu/clima/policies/f-gas_en)

Continued list of CAS numbers and substance names from first page:

CAS Number	Substance
various	Unsaturated Hydro(chloro) fluorocarbons
various	Fluorinated Ethers and Alcohols
69991-67-9	Perfluoropolymethylisopropyl-ether (PFPMIE)
7783-54-2	Nitrogen Trifluoride
373-80-8	Trifluoromethyl Sulphur Pentafluoride
931-91-9	Hexafluorocyclopropane

### References

- <sup>1</sup> European Commission. Climate Action - Fluorinated greenhouse gases. Retrieved August 15, 2017, from [https://ec.europa.eu/clima/policies/f-gas\\_en](https://ec.europa.eu/clima/policies/f-gas_en)
- <sup>2</sup> United States Environmental Protection Agency. Overview of Greenhouse Gases - Emissions of Fluorinated Gases. Retrieved August 15, 2017, from <https://www.epa.gov/ghgemissions/overview-greenhouse-gases#f-gases>
- <sup>3</sup> Becken, K., De Graaf, D., Elsner, C., Hoffman, G., Krüger, F., Martens, K., ... Sartorius, R. (2011, August). Avoiding Fluorinated Greenhouse Gases: Prospects for Phasing Out (Publication). Retrieved August 15, 2017, from German Federal Environment Agency website: <http://www.umweltbundesamt.de/sites/default/files/medien/publikation/long/3977.pdf>
- <sup>4</sup> ZDHC Manufacturing Restricted Substances List (ZDHC MRSL) [https://www.roadmaptozero.com/mrsl\\_online/](https://www.roadmaptozero.com/mrsl_online/)