

APPENDIX 1 - Fluorinated greenhouse gases (F gases) subject to the EU Fluorinated Greenhouse Gases regulation 2014 (as listed in Annex 1 of that regulation)

This is a table of fluorinated greenhouse gases (F gases) regulated by the EU. The table includes the global warming potential of each F gas. You can use the global warming potential to calculate the carbon dioxide equivalent weight of an F gas.

Section 1 Hydrofluorocarbons (HFCs)

Substance			Global warming potential
Industrial designation	Chemical name (Common name)	Chemical formula	
HFC-23	trifluoromethane (fluoroform)	CHF ₃	14 800
HFC-32	difluoromethane	CH ₂ F ₂	675
HFC-41	fluoromethane (methyl fluoride)	CH ₃ F	92
HFC-125	pentafluoroethane	CHF ₂ CF ₃	3 500
HFC-134	1,1,2,2-tetrafluoroethane	CHF ₂ CHF ₂	1 100
HFC-134a	1,1,1,2-tetrafluoroethane	CH ₂ FCF ₃	1 430
HFC-143	1,1,2-trifluoroethane	CH ₂ FCHF ₂	353
HFC-143a	1,1,1-trifluoroethane	CH ₃ CF ₃	4 470
HFC-152	1,2-difluoroethane	CH ₂ FCH ₂ F	53
HFC-152a	1,1-difluoroethane	CH ₃ CHF ₂	124
HFC-161	fluoroethane (ethyl fluoride)	CH ₃ CH ₂ F	12
HFC-227ea	1,1,1,2,3,3,3-heptafluoropropane	CF ₃ CHFCF ₃	3 220
HFC-236cb	1,1,1,2,2,3-hexafluoropropane	CH ₂ FCF ₂ CF ₃	1 340
HFC-236ea	1,1,1,2,3,3-hexafluoropropane	CHF ₂ CHFCF ₃	1 370
HFC-236fa	1,1,1,3,3,3-hexafluoropropane	CF ₃ CH ₂ CF ₃	9 810
HFC-245ca	1,1,2,2,3-pentafluoropropane	CH ₂ FCF ₂ CHF ₂	693
HFC-245fa	1,1,1,3,3-pentafluoropropane	CHF ₂ CH ₂ CF ₃	1 030
HFC-365 mfc	1,1,1,3,3-pentafluorobutane	CF ₃ CH ₂ CF ₂ CH ₃	794
HFC-43-10 mee	1,1,1,2,2,3,4,5,5,5-decafluoropentane	CF ₃ CHFCHFCF ₂ CF ₃	1 640

Section 2 Perfluorocarbons (PFCs)

Substance			Global warming potential
Industrial designation	Chemical name (Common name)	Chemical formula	
PFC-116	hexafluoroethane (perfluoroethane)	C ₂ F ₆	12 200
PFC-218	octafluoropropane (perfluoropropane)	C ₃ F ₈	8 830
PFC-3-1-10 (R-31-10)	decafluorobutane (perfluorobutane)	C ₄ F ₁₀	8 860
PFC-4-1-12 (R-41-12)	dodecafluoropentane (perfluoropentane)	C ₅ F ₁₂	9 160
PFC-5-1-14 (R-51-14)	tetradecafluorohexane (perfluorohexane)	C ₆ F ₁₄	9 300
PFC-c-318	octafluorocyclobutane (perfluorocyclobutane)	c-C ₄ F ₈	10 300

Section 3 Other perfluorinated compounds

Substance			Global warming potential
Industrial designation	Chemical name (Common name)	Chemical formula	
	sulphur hexafluoride	SF ₆	22 800

APPENDIX 2 - Leakage check requirements

Leakage checks are **not** required for:

- Hermetically sealed equipment, containing less than 10 tonnes CO₂ equivalent and labelled as hermetically sealed.
- Electrical switchgear when it:
 - o Has a tested leakage rate of less than 0.1% per year as set out in the manufacturers specification OR
 - o Is equipped with a pressure or density monitoring device OR
 - o Contains less than 6 kg F-gas.

For refrigeration, air conditioning, heat pumps, stationary fire protection and refrigerated trucks and trailers, all checks should be carried out by a certified person.

Table 1 – Leakage check frequencies

CO ₂ equivalent (tonnes)	Minimum leakage check frequency	Minimum leakage check frequency if leakage detection system installed
≥5 - <50	12 months	24 months
≥50 - <500	6 months	12 months
≥500	3 months	6 months

Table 2 – Specific provisions for equipment containing 500 tonnes of CO₂ equivalent or more

Equipment	Leakage check requirements	Frequency of checks of leakage detection systems
Stationary refrigeration Stationary air conditioning Stationary heat pumps Stationary fire protection	Leakage detection system with alerts to operator required	12 months
Electrical switchgear	Leakage detection system with alerts to operator required if installed after January 2017	6 years
Organic Rankine cycles	Leakage detection system with alerts to operator required if installed after January 2017	12 months

Table 3 - CO₂ equivalent thresholds for commonly used F-gases

CO ₂ (tonnes)	HFC 23 (kg)	HFC 227ea (kg)	HFC 404A (kg)	HFC 410a (kg)	HFC 134a (kg)
5	0.3	1.6	1.3	2.4	3.5
50	3.4	15.5	13	24	35
500	34	155	127	240	350

Fluorinated Greenhouse Gases Regulation 2014 – Natural Resources Wales Questionnaire

1. Do you have any equipment containing Fluorinated greenhouse gases (see Appendix 1)?

Yes/ No

If yes, please complete the rest of the questionnaire.

2. Which of the following equipment are you using that contains F-gas?

- | | |
|------------------------------------|--------|
| - Stationary refrigeration | Yes/No |
| - Stationary air conditioning | Yes/No |
| - Stationary fire protection | Yes/No |
| - Heat pumps | Yes/No |
| - Refrigerated trucks and trailers | Yes/No |
| - Electrical switchgear | Yes/No |
| - Organic Rankine cycle | Yes/No |
| - Other | |

3. Please provide information on the type and volume of F-gas in each separate piece of equipment.

4. Is your equipment repaired and maintained by a suitably qualified person? (Please answer for each separate piece of equipment)

Yes/No

5. Please provide the name of the company who undertakes your system maintenance and repairs.

6. Do your systems have the appropriate labels?

Yes/No

7. Do you have records of checks to your equipment?

Yes/No

Please complete your questionnaire (including any negative response to question 1) by the xxxx and return to:

██████████
Natural Resources Wales
Ty Cambria
29 Newport Road
Cardiff
CF24 0TP

Or electronically to ██████████ cyfoethnaturiolcymru.gov.uk