

Revised F Gas Regulation—2014

Understanding GWP values

This Fundamentals Guide will be the first in a series based on the newly revised F Gas Regulation requirements. The new Regulation (EC) 517/2014 was passed in Europe in April 2014 and UK legislation will follow later this year. The SES will be helping to prepare members - and your customers or trainees - with information about changed and new requirements. Here we give a summary of the key changes and some information about why knowing the GWP value of HFC refrigerants is going to be more important in future.

The major changes

1— Leak testing

In EU517/2014 the requirement for leak testing existing systems is based on the charge size in tonnes of CO₂ equivalent. So systems with higher GWP refrigerants will need to be leak tested more frequently than those with the same charge weight of a lower GWP refrigerant.

The GWP of single substance refrigerants is provided in an Annex to EU 517 / 2014 and for blended refrigerants it must be calculated from the GWP of the individual components (see later section for information on this).

The leak test frequency is given in the table below, with some example charge sizes for different refrigerants.

System charge	Leak test frequency
5* to < 50 tonnes CO ₂ equiv. e.g. 1.27 to < 12.7 kg R404A e.g. 2.37 to < 23.7 kg R407A e.g. 3.49 to < 34.9 kg R134a	1 / year 1 / 2 years if a fixed leak detection system is fitted
50 to < 500 tonnes CO ₂ equiv. e.g. 12.7 to < 127 kg R404A e.g. 23.7 to < 237 kg R407A e.g. 34.9 to < 349 kg R134a	2 / year 1 / year if a fixed leak detection system is fitted
> 500 tonnes CO ₂ equiv. Fixed leak detection must be fitted e.g. > 127 kg R404A e.g. > 237 kg R407A e.g. > 349 kg R134a	4 / year 2 / year if a fixed leak detection system is fitted

*10 tonnes CO₂ equivalent for hermetically sealed systems (e.g. 2.54 kg R404A, 6.98 kg R134a). This is applicable from 1st January 2017.

Fixed leak detection must alert the operator of the system or the service company and must be checked once a year. The requirement for maintaining system logs changes from 3kg HFC to 5 tonnes CO₂ equivalent

2 - Training and certification

The current F Gas qualification such as City and Guilds 2079-11 is still the acceptable qualification. However, there is an additional requirement that certification programmes and training should include information on relevant technologies to replace or to reduce the use of fluorinated greenhouse gases and their safe handling.

This is likely to include hydrocarbon refrigerants, R744 and HFOs, but the UK has not yet determined how this is to be provided. We will provide information on this as soon as possible.

3 - Service bans

From 1st January 2020 the use of F Gases with GWP > 2500 for service will be prohibited for systems which contain more than 40 tonnes CO₂ equivalent. The most common HFC affected by this ban is R404A. A charge of 10.2 kg R404A is equivalent to 40 tonnes CO₂.

There is an exclusion - recycled or reclaimed refrigerant can be used until 1st January 2030.

4 - Placing on the Market Bans

There is a gradual phase out of the use of some HFCs, dependent on GWP and application. The most applicable are shown in the table below.

Ban effective from 1 st Jan ...	Application	Ban effective for refrigerants with a GWP greater than ...
2015	Domestic fridges, freezers	150
2020	Commercial fridges, freezers	2500
2022	Commercial fridges, freezers	150
2020	Most stationary HFC equipment	2500
2022	Central plant greater than 40 kW cooling capacity Except as the high stage of a cascade	150 1500
2020	Moveable room air conditioning	150
2025	Single split air conditioning with less than 3kg charge	750

Note – this is for new systems sold from the dates shown, not existing systems.

5 - Pre Charged Systems

Non hermetically sealed pre charged unit will only be able to be installed by a company which employs engineers who hold an F Gas qualification (e.g. City and Guilds 2079-11 or Construction Skills J11). An example of such a system is a split air conditioning unit where the outdoor unit is pre charged with the refrigerant.

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Understanding the importance of GWP Values under the new F Gas Regulations

Introduction

GWP values of various refrigerants are important for a number of reasons, not least as a means of comparing their relative effect when they are released to atmosphere. As science progresses and reviews take place the GWP values of some refrigerants have altered slightly, which has led to a number of different values being quoted. For instance the F-Gas Regulation (EC) 842/2006 referred to the 3rd IPCC assessment. The new F-Gas Regulation (EC) 517/2014 which will come into effect on 1st January 2015 will use the 4th IPCC assessment values.

New F-Gas Regulation

One of the requirements of the new regulation relates to leak check requirements which are based upon the GWP CO₂ equivalent Tonnes. This means that the threshold level for leak checking different refrigerants varies dependent upon the GWP of the refrigerant that is used. The new regulation uses the 4th assessment values which are listed in annex 1 for the single component F-Gases. Annex 2 covers other fluorinated greenhouse gases. Whilst annex 4 states the method for calculating the total GWP of a mixture or blend. It also lists the GWP value to be used for non-fluorinated substances that are used in mixtures or blends. The GWP values of relevance from Annex 1 are given in the table on the right.

Refrigerant	GWP value
HFC 23	14800
HFC32	675
HFC 125	3500
HFC 134a	1430
HFC 143a	4470
HFC 152a	124
HFC 227ea	3220
HFC 236fa	9810

The GWP of relevant refrigerant mixtures and blends are shown in the table overleaf.

Sources of more information

- F-Gas Regulation (EC) 517/2014 http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.150.01.0195.01.ENG
- 4th IPCC assessment values http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html
- ACRIB is the umbrella organisation for the UK RACHP industry comprising trade associations and professional institutes: AMDEA, ARC, B&ES, BFFF, CIBSE, CRT, FETA, FSDF, IOR. It provides the ACRIB Skillcard scheme for the recognition of individual operative qualifications in working with the full range of refrigerants. For more information see <http://www.acrib.org.uk>

Changes to Leak Checking Requirements

The new F-Gas regulation sets leak checking requirements based upon 5, 50 and 500 CO₂ Equivalent Tonnes. With the most significant changes affecting high GWP refrigerants for the 500 CO₂ Equivalent Tonnes as fixed leak detection is required for this threshold. The different requirements are shown in the table below for current refrigerants and blends.

The new F Gas leak checking requirements will take effect from 1st January 2015, except for systems with a charge below 3kg (6kg for hermetic systems) where it will apply from 1st January 2017.

Refrigerant	Other		5 T	50 T	500 T
	Names	GWP	CO ₂ Eq.	CO ₂ Eq.	CO ₂ Eq.
23		14800	0.3	3.4	34
32		675	7.4	74.1	741
134a		1430	3.5	35.0	350
125		3500	1.4	14.3	143
245fa		1030	4.9	48.5	485
404A		3922	1.3	12.7	127
407A		2107	2.4	23.7	237
407C		1774	2.8	28.2	282
407D		1627	3.1	30.7	307
407F	Performax LT™	1825	2.7	27.4	274
410A		2088	2.4	23.9	239
417A	ISCEON® MO59	2346	2.1	21.3	213
422A	ISCEON® MO79	3143	1.6	15.9	159
422D	ISCEON® MO29	2729	1.8	18.3	183
423A	ISCEON® 39TC™	2280	2.2	21.9	219
424A	RS44	2440	2.0	20.5	205
426A	RS24	1508	3.3	33.2	332
427A	FX100	2138	2.3	23.4	234
428A	RS52	3607	1.4	13.9	139
434A	RS45	3245	1.5	15.4	154
437A	ISCEON® MO49plus	1805	2.8	27.7	277
438A	ISCEON® MO99	2265	2.2	22.1	221
442A	RS50	1888	2.6	26.5	265
507		3985	1.3	12.5	125
508A		13214	0.4	3.8	38
508B	Suva 95	13396	0.4	3.7	37
-	ISCEON® MO89	3805	1.3	13.1	131

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