

Practical Guidelines for End Users on the F-Gas Regulation Revision 2014.

1. Introduction.

The F-Gas Regulation, which has had a major impact on the selection, use and maintenance of most refrigeration and air conditioning systems over the last 8 years, has recently been reviewed and revised by the EU and these revisions will start to come into force from 1st January 2015, this will have an impact on most current and future users of this type of equipment.

The following guidelines are our interpretation of the revision and are intended to provide some background details about the regulation and how in practice the revised regulations will affect users.

2. Background.

For many years the environmental impact of refrigerants escaping into the atmosphere has been a concern to the scientific community, initially it was identified that refrigerants such as R11, R12, R22 and R502, which were commonly used for many years were having a negative impact on the Ozone layer.

As a result of research and resulting environmental pressures the Ozone Regulations were introduced some years ago to control the use and eventual phase out of this family of CFC and HCFC refrigerants.

The RAC industry then needed to have practical replacements for these products, and HFC refrigerants such as R134a, R404A and R410A were introduced and still continue to be commonly used. However these and similar refrigerants commonly known as F-Gases also have a considerable environmental impact due to their high Global Warming Potential (GWP).

To help control the use and emissions of these refrigerants and other such substances the original F-Gas Regulation (EC) 842/2006 was introduced in 2006, this in practice resulted in RAC engineers requiring the City & Guilds 2079 or CITB equivalent F-Gas qualification to handle these refrigerants, the need for regular leak testing for most systems and associated F-Gas log books, along side improved good practice in relation to refrigerants and system design. *Legal responsibilities were also placed on end users to ensure their contractors complied with the requirements of the regulation.*

The latest review and subsequent revision of the F-Gas regulation has the aim of reducing, by gradual reduction, F-Gas emissions by two thirds of today's levels by the year 2030 and to encourage the use of viable and more climate friendly alternatives where they are available or in fact encourage the development of such substances.

The focus of the F-Gas revision is very much on the GWP value of refrigerants as opposed to just quantity, as the higher the GWP of a refrigerant the more harm it would do if accidentally released into the environment.

Therefore whereas in the past the inspection and leak detection obligations were based on quantity of refrigerant in a system i.e. 3 to 30 Kg, 30 to 300 Kg and over 300 Kg, they will in future be based on equivalent tonnes of CO₂ with breaks as follows: Between 5 & 50 tonnes, Between 50 and 500 tonnes and greater than 500 tonnes.

See section 4 for practical examples of refrigerant quantity / CO₂ tonnes equivalent for common refrigerants.

It should be noted this regulation is European based and applies to EU member states, other parts of the world have different or no restrictions to the use of such substances, however there is an accepted drive toward reducing overall global emissions with the EU being one of the lead parties.

3. The Main Features of the Revised F-Gas Regulation (EU) 517/2014.

The Regulation establishes the following:

- Cap and phase-down for the placing on the market of HFC's
- Bans or restrictions based on GWP of the use of F-Gases in some new equipment, such as refrigerators and air conditioners, insulating foams and technical aerosols
- Conditions (for example, reporting on quantities of HFCs contained and the need for HFC import quotas) on the placing on the market of products and equipment containing or relying upon F-Gases
- Future restrictions on servicing/maintenance of equipment using HFC's
- Rules regarding containment, use, recovery and destruction of HFC's
- The Regulation will apply from **1st January 2015**

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4. Leak Detection / System Inspection Requirements.

Some of the common refrigerants currently in use are shown below with revised charge / leak detection requirements.

You will note those with higher GWP ratings fall into the need to be tested with smaller charge weights.

Refrigerant	GWP Rating	Equivalent Tonnes CO2 per Kg Charge	5 to 50 tonne range	50 to 500 tonne range	Greater than 500 tonnes
R134a	1430	1.43	3.49 – 34.9 Kg	34.9 – 349 Kg	Over 349 Kg
R404A	3922	3.922	1.27 – 12.7 Kg	12.7 – 127 Kg	Over 127 Kg
R407F	1825	1.825	2.74 – 27.4 Kg	27.4 – 274 Kg	Over 274 Kg
R410A	2088	2.088	2.39 – 23.9 Kg	23.9 – 239 Kg	Over 239 Kg
R407C	1774	1.774	2.82 – 28.2 Kg	28.2 – 282 Kg	Over 282 Kg
Frequency of Inspection / Leak Detection			Every 12 months	Every 6 months	---
If Fixed Leak Detection System Fitted			Every 24 months	Every 12 months	Every 6 months
Fixed Leak Detection Requirement			No	No	Yes

It is the responsibility of the user to ensure the correct level of inspection and leak detection is carried out on systems under their control.

If in doubt about how this requirement affects you please contact one of our technical team for guidance.

5. Restrictions & Bans.

The following chart indicates the condition and timetable for new equipment bans relating to F-Gas use.

Equipment Description	Ban Date	
Domestic refrigerators and freezers that contain HFC's with GWP of 150 or more	1st January 2015	
Refrigerators and freezers for commercial use (hermetically sealed systems)	that contain HFC's with GWP of 2500 or more	1st January 2020
	that contain HFC's with GWP of 150 or more	1st January 2022
Stationary refrigeration equipment, that contains, or that relies upon for its functioning HFC's with GWP of 2500 or more except equipment intended for application designed to cool products to temperatures below -50°C	1st January 2020	
Multipack centralised refrigeration systems for commercial use with a capacity of 40kW or more that contain, or that rely upon for their functioning, fluorinated greenhouse gases with GWP of 150 or more, except in the primary refrigerant circuit of cascade systems where fluorinated greenhouse gases with a GWP of less than 1500 may be used	1st January 2022	
Movable room air-conditioning appliances (hermetically sealed equipment which is movable between rooms by the end user) that contain HFCs with GWP of 150 or more	1st January 2020	
Single split air-conditioning systems containing less than 3kg of fluorinated greenhouse gases, that contain, or that rely upon for their functioning, fluorinated greenhouse gases with GWP of 750 or more	1st January 2025	

The above along with future availability of refrigerant and matched components will have an impact on the design considerations for new equipment from now on.

These restrictions and bans will have an impact on system design and future operation and serviceability of equipment, for advice and guidance with equipment selection please contact one of our technical team.

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6. Servicing & Maintenance Restrictions.

A number of provisions on service and maintenance have been introduced as follows;

- The use of fluorinated greenhouse gases with a GWP> 2500 to service or maintain refrigeration equipment with a charge size of 40 tonnes of CO2 equivalent or more shall be prohibited from 1st January 2020. This provision shall not apply to military equipment or equipment intended for applications designed to cool products to temperatures below -50°C.

The maximum allowable charge weights for some of the popular high GWP refrigerants are illustrated below:

Refrigerant Type	GWP	Max Charge Size (40 tonnes CO2 Equivalent)
R404A	3922	10.2 Kg
R507A	3985	10.0 Kg
R422A (Isceon M079)	3143	12.7 Kg
R422D (Isceon M029)	2729	14.6 Kg
R434A (RS45)	3245	12.3 Kg

Above these system charge weights, a refrigerant with a lower GWP would need to be used if refrigerant is lost, or reclaimed / recycled refrigerant used to support the equipment as was the case with R22 systems and R22R (see below).

- Until 1st January 2030, this provision shall not apply to reclaimed fluorinated greenhouse gases with a GWP>2500 used for the maintenance or servicing of existing refrigeration equipment, provided that they have been labeled in accordance with Article 10 (4a) to Article 9 (3).
- Until 1st January 2030 this provision shall not apply to recycled fluorinated greenhouse gases with a GWP>2500 used for the maintenance or servicing of existing refrigeration equipment provided they have been recovered from such equipment. Such recycled gases may only be used *by the undertaking* which carried out their recovery as part of maintenance or servicing *or the undertaking for which the recovery was carried out as part of maintenance or servicing.*

7. Labelling.

From 1st January 2017 labelling on equipment relating to the refrigerant charge which currently requires listing of the refrigerant type and total weight must also include the refrigerant GWP and the equivalent CO2 charge weight in tonnes.

Where base charges are stated and top up refrigerant is required this should also be expressed in the same format of CO2 charge weight in tonnes.

To calculate this the refrigerant GWP and total charge weight will need to be known.

8. Market Forces & Best Advice.

Whilst the revised legislation will provide the framework to push change, in practice market forces such as the cost and availability of refrigerants and equipment, and technical developments will drive the ongoing evolution of the Refrigeration and Air Conditioning Industry.

We would not expect all our customers to be fully aware of the detailed regulations and options available in the ever-changing market place we operate in, however we are available to offer this specialist advice and support to ensure you make the correct decisions for your individual businesses.