

F-GAS REGULATIONS & A2L REFRIGERANT UPDATE

TECHNICAL BULLETIN

Shaun Cockcroft

scockcroft@mansfieldpollard.co.uk

DOCUMENT INDEX:

F-Gas Regulations.....	Page 2
Phase Down.....	Page 2
Product and Equipment Bans.....	Page 3-4
Leakage Checks and Leak Detection.....	Page 5
Preparing For The Future.....	Page 6
The Future - A2L Refrigerants.....	Page 7
Mansfield Pollard.....	Page 7



F-GAS REGULATIONS:

The European Union has published its latest revision to the F-Gas regulation (517/2014). This regulation replaces the previous version (842/2006).

This update has led to several positive changes within the industry, such as;

- (i) The restriction on the sale of f-gases, only to users that have the appropriate certification
- (ii) Updated requirements for leakage control, checks and detection.
- (iii) Restrictions on the ability to sell some refrigeration and air conditioning equipment.
- (iv) Limits placed on the use of higher GWP gases such as R404A and R507A in existing equipment from 2020.
- (v) Reductions through a market cap on the supply of HFC's

PHASE DOWN

The regulations formally state:

Article 15

"The commission shall ensure that the quantity of HFCs that producers and importers are entitled to place on the market does not exceed a maximum quantity for the year in question as calculated in accordance with Annex V."

Article 14

"From 1st January 2017 refrigeration, air conditioning and heat pump equipment charged with hydrofluorocarbons shall not be placed on the market unless hydrofluorocarbons charged into the equipment are accounted for within the quota system..."

Annex V: Phase Down Schedule CO₂e basis in %)

2009-2012 AVERAGE	2015	2016-17	2018-20	2021-23	2024-26	2027-29	2030
BASELINE 100%	100%	93%	63%	45%	31%	24%	21%

During the "Phase Down" schedule there are some major reductions in HFC's and it is expected that by 2030, the supply of HFCs will have reduced to 21% of baseline levels.

In addition we have seen the price of HFC's such as R410A continue to increase substantially throughout 2017 and into 2018.

During this period as the industry begins to migrate over to newer refrigerants, many individuals and organisations believe there is a potential risk of supply shortage alongside these price increases.

PRODUCT & EQUIPMENT BANS

The “Phase Down” of certain refrigeration gases are also accompanied by bans on certain equipment. An extract from Annex III of the regulations can be found below:

BAN TYPE & NUMBER IN TEXT (additional bans on top of existing f-gas regulations 842/2006)	DATE (1st Jan in year)
11 Refrigerators and freezers for commercial use (hermetically sealed) that contain: -HFCs with GWP of 2500 or more -HFCs with GWP of 150 or more	2020 2022
12 Stationary refrigeration equipment containing f-gases with GWP 2500 or more; except equipment intended for applications designed to cool products to temperatures below – 50°C	2020
13 Multipack centralised refrigeration systems for commercial use with a rated capacity of 40kW or more that contain, or whose functioning relies upon, f-gases with GWP 150 or more; except in the primary circuit of cascade system where f-gases with a GWP of less than 1500 may be used	2022
14 Movable room air conditioning equipment that contain HFCs with GWP of 150 or more	2020
15 Single split air conditioning systems container less than 3kg of gases, with GWP of 750 of more	2025
16 Foams that container HFCs with GWP of 150 or more except when required to meet national safety standards.: -Extruded polystyrene -Other foams	2020 2023
17 Technical aerosols that contain HFCs with GWP of 150 or more; except when required to meet national safety standards or when used for medical applications	2018

In addition to the product bans above there will also be service and maintenance bans
Article 13(3) Refrigeration Service Bans:

From 1st January 2020, the use of fluorinated greenhouse gases with a GWP of 2500 or more, to service or maintain refrigeration equipment with a charge size of 40 tonnes of (CO₂e) or more, shall be prohibited.

This paragraph shall not apply to:

- ❖ Military equipment
- ❖ Equipment intended for applications designed to cool products to temperatures below – 50°C
- ❖ Reclaimed or recycled f-gases providing they have been labelled in accordance with Article 12. Recycled gases may only be used by the undertaking which carried out the recovery or the undertaking for which the recovery was carried out (Until 1.1.2030)
- ❖ Refrigeration equipment for which an exemption has been received.

LEAKAGE CHECKS & DETECTION

The new regulations place a greater emphasis on the use of certified personnel to carry out works on refrigeration systems.

Article 4: Leak Checks

Operators of the following equipment, that contain f-gases in quantities of 5 tonnes CO₂e or more and are not contained in foam, shall ensure that the equipment is checked for leaks:

- a) Stationary refrigeration equipment
- b) Stationary air conditioning equipment
- c) Stationary heat pumps
- d) Stationary fire protection equipment
- e) Refrigeration units of refrigerated trucks and trailers
- f) Electrical switchgear
- g) Organic Rankine cycles

Exceptions apply for:

- ❖ Hermetically sealed equipment that contains f-gases in quantities of less than 10 tonnes CO₂e provided the equipment is labelled as hermetically sealed
- ❖ Electrical switchgear with tested leakage of less than 0.1% per year and labelled accordingly
- ❖ Electrical switchgear equipped with a pressure or density monitoring device
- ❖ Electrical switchgear that contains less than 6kg f-gases

LEAK CHECK FREQUENCY

F-GAS SYSTEM CONTENTS	LEAK CHECK FREQUENCY	LEAK CHECK FREQUENCY
	(No leak detection system installed)	(Detection system installed)
500 tonnes CO ₂ e or more	At least once every 3 months	At least once every 6 months
50-499.99 tonnes CO ₂ e or more	At least once every 6 months	At least once every 12 months
5-49.99 tonnes CO ₂ e or more	At least once every 12 months	At least once every 24 months

COMMON REFRIGERANTS

REFRIGERANT	GWP	LEAK DETECTION (5 tonnes CO ₂ e threshold equivalent weight (kg))	LEAK DETECTION (50 tonnes CO ₂ e threshold equivalent weight (kg))	LEAK DETECTION (500 tonnes CO ₂ e threshold equivalent weight (kg))
R410A	2088	204	23.9	239
R404A	3922	1.3	12.7	127
R32	675	7.4	74.1	741

As the phase down continues and product/service bans start to impact the marketplace, it is important that businesses begin to make plans for the future, considering both new planned installations, recent additions and existing installed assets/plant.

There are several options available to them;

Option 1 – Monitor and maintain

This is the more economical option, but also potentially the riskiest. Firstly, it is important to ensure that sufficient checks are in place for leak detection.

In the future, a “drop in” alternative refrigerant may be available for the equipment, but this cannot be guaranteed at this point. It is worth noting that several of the newer lower GWP refrigerant HFOs are classed as A2L refrigerants and come with their own considerations and challenges.

Option 2- Replacement Gas

Depending on the system, there are alternative HFC and HFC/HFO blends available or currently being tested. Many of these newer refrigerants are not subject to the same service bans.

There may be several implications to this such as cost, efficiency and/or capacity changes with the replacement. When considering this option, a detailed plant survey should be carried out to determine suitability with the installed equipment.

Option 3- Replacement Equipment

When all other options have been explored it may be necessary to look at installing new plant. When considering new plant, it may prove more economical to consider upgrading the existing refrigeration system to cool a secondary fluid such as water or glycol. Whilst the pipework and heat exchangers would need to be replaced, you may save some cost in maintaining existing compressors and condenser coils.

THE FUTURE: A2L REFRIGERANTS

- ❖ A new family of refrigerants called HFO's has been developed which offer a low GWP option, however they also exhibit lower flammability and as such are classified as A2L.
- ❖ A2L refrigerants will burn but their burning velocity is below 10cm/s. In practical terms it may therefore be difficult to ignite A2L gases.
- ❖ Precautions must also be taken to prevent accidental build-up of the refrigerant.
- ❖ Currently, the HSE in the UK does not recognise the A2L classification and still views these products as highly flammable. Hence safety guidance will need to be reviewed for installations containing A2L refrigerants using DSEAR. This will require a risk assessment to be undertaken, reviewing the application, location of components, and the installed refrigerant charge.
- ❖ All flammable refrigerants (class A2L and above) will not ignite if the concentration level in a room stays below the lower flammability level (LFL). Safety legislation and standards such as ISO 5149 and EN 378 define requirements to maintain levels below the flammability threshold in case of leakage.
- ❖ For further reference the new version of EN 378: 2016 gives guidelines for ensuring that systems do not exceed the maximum amount of charge in a specific area.
- ❖ R-32 has now been widely marketed as an alternative to R-410A due to its similarities and its successful use in systems in Japan. It must be stressed however that the regulations in Japan differ greatly to those in the UK and Europe.



Mansfield Pollard, as a knowledgeable and trusted advisor in this field, are looking to develop a range of products utilising lower GWP refrigerants. We are well placed to offer our expert advice on any specific requirements you may have and ask that you contact us to enable us to work with you in finding a solution that meets your needs.

www.mansfieldpollard.co.uk

salesteam@mansfieldpollard.co.uk

Tel: +44 (0) 1274 774050



Mansfield Pollard & Co. Ltd

Edward House, Parry Lane, Bradford, BD4 8TL, United Kingdom

t: +44 (0)1274 774050 **e:** salesteam@mansfieldpollard.co.uk

www.mansfieldpollard.co.uk