

EU F-Gas Regulation Guidance

Information Sheet 10: Fire Protection Systems

Target audience for this Information Sheet

This Information Sheet is aimed at operators of fire protection systems using HFCs and PFCs. It is also useful for those organisations that manufacture, sell, maintain and dispose of HFC-based fire protection equipment.

1. Background

This guidance is for organisations affected by the 2014 EU F-Gas Regulation (517/2014). The F-Gas Regulation creates controls on the use and emissions of fluorinated greenhouse gases (F-Gases) including HFCs, PFCs and SF₆.

In the fire protection sector, the F-Gas Regulation affects the use of HFCs and PFCs as fire extinguishing fluids in various specialised building applications. The 2014 EU F-Gas Regulation replaces the 2006 Regulation, strengthening all of the 2006 requirements and introducing a number of important new measures.

The F-Gas Regulation is an important piece of legislation that will result in significant reductions in the emissions of F-Gases. These are very powerful greenhouse gases, with global warming impacts that are several thousand times higher than CO₂ (per kg of gas emitted). All EU Member States agree that it is important to reduce emissions of these gases.

This Information Sheet describes the requirements that apply to fire protection systems. Further guidance is available – see Information Sheet 30 for a full list and a glossary of terms.

Fire Protection Systems: Compliance Checklist for EU F-Gas Regulation

Purchase of new equipment

- ✓ **NEW:** Comply with certain bans on the use of HFCs and PFCs in new fire protection systems
- ✓ **NEW:** Take account of HFC phase down when selecting fire extinguishing fluids
- ✓ Fire protection products containing HFCs must be labelled

Operation of existing equipment

- ✓ Mandatory leak checks and repairs
- ✓ **NEW:** Use new CO₂ equivalent size thresholds for mandatory leak checks
- ✓ **NEW:** Use new size thresholds for automatic leak detection (from 1st Jan 2015)
- ✓ Keep records about fire protection equipment using HFCs
- ✓ Use qualified technicians for leak checking and HFC handling operations

End-of-life requirements

- ✓ Mandatory recovery of HFCs by a qualified technician

2. Sector description

The fire protection industry make use of HFC fire extinguishing products in certain specialised applications. There are 3 main categories of HFC equipment used in the fire protection sector:

- a) **Specialised building applications**, where building contents have a high value and other fire protection systems (e.g. water based) could cause too much damage. In the UK most systems of this type use HFC 227ea (also referred to by trade names such as FM 200).
- b) **Small automatic extinguishers**. Small automatic extinguishers based on HFCs can be used for applications such as bus engine, small boat engine and motorsport fire protection.
- c) **Hand held extinguishers**. Despite very few HFC portable fire extinguishers being used in the UK, they are still permitted.

3. Purchase of new equipment

HFC Bans

The 2014 F-Gas Regulation includes certain bans applied to placing new fire protection systems on the market in the EU as summarised in Table 1.

Table 1: Bans on HFCs used in new fire protection systems

Ban description		Start date from 1 st January:
1	Fire protection systems containing PFCs	2007
2	NEW: Fire protection systems containing HFC 23	2016

NEW: Impact of the HFC Phase Down on the purchase of new equipment

When purchasing new fire protection equipment you should consider the HFC phase down¹. This will reduce the quantity of virgin HFCs that can be sold in the EU – by 2030 there will be an 80% cut in HFC supply². Equipment bought now will still be operating when deep cuts in HFC supply are in force. Irrespective of the bans described above, it makes sense to always purchase equipment using fire extinguishing fluids with the lowest practical GWP to minimise the future impact of the phase down³.

Product Labelling

All fire protection systems that contain F-Gases (including HFCs) shall not be placed on the market unless the F-Gases are identified with a label. The label shall indicate the following information:

- 1) A reference that the fire extinguishing agent contains an F-Gas
- 2) The accepted industry designation for the F-Gas concerned or, if no such designation is available, the chemical name

¹ HFC phase down: see Information Sheet 28 for further details

² It is worth noting that recycled and reclaimed HFCs are not included in the phase down process. Within the fire protection sector the use of recycled and reclaimed HFCs may become important during the phase down.

³ Low GWP alternatives to HFCs: see Information Sheet 29 for further details

- 3) **NEW:** From 1 January 2017, the quantity expressed in weight and in CO₂ equivalent of F-Gas contained in the fire protection system, and the global warming potential of the F-Gas used.

4. Operation of existing equipment

The 2014 F-Gas Regulation includes a number of requirements that affect the use and maintenance of existing fire protection systems containing HFC fire extinguishing fluids. The rules depend on the type and size of fire protection systems being used. The regulations affecting existing equipment relate to (a) leak prevention, (b) record keeping and (c) the use of trained technicians. These requirements are described below.

Leak prevention and mandatory leak checks

The intentional release of F-Gases into the atmosphere is prohibited and operators⁴ of all fire protection systems must take all measures that are technically and economically feasible to minimise leakage. Where leaks are detected operators must carry out repairs without undue delay.

NEW: Under the 2006 Regulation, the legal responsibility for preventing F-Gas releases was only given to the operator of the equipment. In the 2014 Regulation there is a similar legal responsibility given to third party contractors carrying out installation, maintenance, leak checking or HFC recovery on behalf of operators.

Mandatory leak checks are required on all stationary fire protection systems above certain size thresholds. Under the 2006 F-Gas Regulation, the thresholds were set in terms of the physical quantity of HFC in the system – those containing more than 3 kg required a regular leak check. **NEW:** Under the 2014 Regulation the requirements are similar, but the size thresholds are defined in terms of tonnes CO₂ equivalent⁵.

These new CO₂ equivalent (CO₂e) size thresholds mean that the kg threshold for each HFC fluid is different. Fire extinguishing fluids with a high GWP (e.g. HFC 23) will have a lower size threshold than fire extinguishing fluids with a lower GWP (e.g. HFC 227ea). Table 2 shows leak testing requirements under both Regulations. Example thresholds are given for HFC 23 and HFC 227ea. A comprehensive table of thresholds for other HFCs is given in Information Sheet 25.

Table 2: Size Thresholds for Mandatory Leak Checks

Leak Check Frequency*	2006 Regulation	2014 Regulation		
	kg threshold for all HFCs	tonnes CO ₂ e threshold for all HFCs	kg threshold for HFC 23	kg threshold for HFC 227ea
Annual	3 kg	5 tonnes CO ₂ e **	0.3 kg	1.6 kg
Every 6 months	30 kg	50 tonnes CO ₂ e	3.4 kg	15.5 kg
Every 3 months	300 kg	500 tonnes CO ₂ e	34 kg	155 kg

* Leak check frequency is halved if automatic leak detection system is installed

All stationary fire protection systems using HFCs contain considerably more than the lower threshold shown in Table 2, so they will all require a mandatory leak test regime. This is unlikely to impact the

⁴ “Operator” is defined as the natural or legal person exercising actual power over the technical functioning of a fire protection system

⁵ Understanding CO₂ thresholds: see Information Sheet 25 for further details

fire protection as many users already have a 6 monthly maintenance regime for all systems. The Regulation recognises that most fire protection systems have regular maintenance and leak checks. The leak checking obligations shall be considered to be fulfilled provided the following two conditions are met:

- the existing inspection regime meets ISO 14520 or EN 15004 standards; and
- the fire protection equipment is inspected as often as shown in Table 2

If a leak is found during a mandatory leak check it must be repaired without undue delay and the leak test repeated within one month to ensure the repair was effective.

Mandatory automatic leak detection

NEW: For all fire protection systems containing 500 tonnes CO₂e or more there is a mandatory requirement for an automatic leak detection system to be fitted. This is a continuation of a similar requirement in the 2006 Regulation, although the size threshold is changed from 300 kg to 500 tonnes CO₂e. This will have an impact on systems using high GWP fire extinguishing fluids. As shown in Table 2, for HFC 227ea systems the new threshold for automatic leak detection systems is reduced from 300 kg to 155 kg. For HFC 23 systems the threshold for automatic leak detection is even lower – at just 34 kg. This rule applies from 1st January 2015. Most fire protection systems are already provided with an automatic leak detection facility as standard.

An automatic leak detection system is defined as a “*calibrated mechanical, electrical or electronic device for detecting leakage of F-Gases which, on detection, alerts the operator or a service company of any leakage*”.

Automatic leak detection systems must be tested at least once every 12 months to ensure their proper functioning.

Record keeping

Operators of fire protection systems must keep records for each piece of equipment that is subject to a mandatory leak check (i.e. above the 5 tonnes CO₂e threshold). The records that must be kept are similar to those required under the 2006 Regulation:

- a) quantity and type of F-Gas installed
- b) quantities of F-Gas added during installation, maintenance or when repairing a leak
- c) **NEW:** whether the F-Gases used have been recycled or reclaimed (including the name and address of the recycling or reclamation facility and, where applicable, the certificate number).
- d) quantity of any F-Gases recovered
- e) the identity of the undertaking that installed, serviced or decommissioned the equipment, including, where applicable, their certificate number
- f) dates and results of all mandatory leak checks
- g) **NEW:** if the equipment was decommissioned, the measures taken to recover and dispose of the F-Gases.

NEW: Records must be kept by the ‘operator’ for at least 5 years. Records collected by a contractor on behalf of an operator must be kept for at least 5 years

The records shall be made available on request to the UK Government’s competent authority (i.e. the Environment Agency) or to the Commission.

5. Use of trained technicians

All HFC handling operations on fire protection systems containing HFC fire extinguishing fluids must be carried out by suitably trained technicians holding an F-Gas 'Competency' certificate and working for an F-Gas Certificated company. This includes plant installation, leak testing, maintenance and end-of-life decommissioning. See Information Sheet 23 for details of all training and certification requirements.

6. Requirements at end-of-life

Any fire protection systems containing HFCs that is being disposed of at end-of-life must undergo an HFC recovery process. Recovery must be carried out by a certificated technician.

All recovered F-Gases can either be:

- a) given a basic cleaning process, to create "recycled HFC".
- b) sent to a specialist plant that can re-process the old HFC into a fluid with properties identical to virgin HFC, to create "reclaimed HFC"
- c) sent for destruction by incineration at a licenced waste facility

Given the HFC supply shortage that will be created by the phase down process, it is worth trying to send the old HFC for reclamation as it may have a good residual value. If the old HFC is too contaminated it cannot be reclaimed and must be sent for destruction. It is important not to mix different gases in the same recovery cylinder – as this would render them unsuitable for reclamation.

Reclaimed HFCs can be used in any equipment. Recycled HFCs must always be used with care as they may be contaminated or of unknown composition.

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This Information Sheet has been prepared by Gluckman Consulting

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