



Complying with Regulations Controlling Fluorinated Greenhouse Gases and Ozone Depleting Substances

A Guidance Note for Contractors working with Fire Protection Equipment

July 2015

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1. Introduction

This Guidance Note is aimed at assisting contractors working on fire protection equipment containing Fluorinated Greenhouse gases (F-gases) or Ozone Depleting Substances (ODS) to comply with the relevant legislation in the Republic of Ireland.

[Regulation \(EU\) No. 517/2014](#) on fluorinated greenhouse gases (hereinafter referred to as ‘the F-gas Regulation’) was published on 16th April 2014 and repeals the previous Regulation (EC) [No. 842/2006](#) (hereinafter referred to as ‘the repealed F-gas Regulation’). The F-gas Regulation applies from the 1st January 2015 and builds upon the provisions provided for in the repealed F-gas Regulation. The existing ten implementing F-gas Regulations associated with the repealed F-gas Regulation are still in effect at the time this guidance was published.

[Regulation \(EC\) No. 1005/2009](#) on substances that deplete the ozone layer (hereinafter referred to as ‘the ODS Regulation’) remains unchanged and sets out obligations relating to ODS and ODS containing equipment.

The F-gas and ODS Regulations are European Regulations that are directly in force in all EU Member States. The purpose of these regulations is to reduce the emissions of F-gases, which contribute to climate change, and ODS, which harm the earth’s ozone layer.

In this Guidance Note new requirements of the F-Gas Regulation are flagged for ease of reference using the word ‘**New!**’ where relevant.

Additional Guidance Notes have been developed relating to the F-gas Regulation and are available at <http://www.fgases.ie/>.

2. F-gases and ODS in Fire Protection Equipment

Gaseous firefighting agents are used in certain specialised applications where traditional firefighting techniques (water, foam, dry powder, etc.) are not appropriate; for example in buildings protecting valuable items or critical plant or machinery such as electronic systems serving computer centres and telecoms, data warehouses, clean rooms, industrial process control rooms, petrochemical factories.

A variety of gases are used for fire suppression, including Carbon Dioxide (CO₂), inert gases, F-gases and ODS.

2.1 F-gases

2.1.1 Stationary Fire Protection Systems

F-gases used in stationary¹ fire protection systems are mainly hydrofluorocarbons (HFCs). F-gases extinguish the fire through heat absorption from the flame, and usually operate through the total flooding of a room or other enclosed space. These are designed and installed to ISO 14520² or

¹ Stationary means not normally in transit during operations.

² [ISO 14520-1:2006 Gaseous fire-extinguishing systems — Physical properties and system design.](#)

EN15004³ standard and are typically installed in data processing and server rooms and to a lesser extent in air traffic control towers, museums, telecommunication centres, hospitals, banks, etc.

2.1.2 Fire Extinguishers

Fire extinguishers containing F-gases are not very common, and are typically used in computer rooms, telecommunication facilities and aircrafts. They are available in all standard sizes of fire extinguishers.

Table 1 shows the most common F-gases used in fire protection equipment. Generally only pure F-gases are used (no blends).

Table 1: Common F-gases used in Fire Protection Equipment

F-gas	Trade Names	Chemical Formula	Typical System
R23	FE-13	CHF ₃	Stationary
R125	FE-25, ECARO, NAF-125	C ₂ HF ₅	Stationary
R227ea	FM-200, FE-227, NAF-227	C ₃ HF ₇	Stationary
R236fa	FE-36	C ₃ H ₂ F ₆	Extinguishers

Note: The use of R-23 in new fire protection equipment is banned from 1st January 2016 under the F-gas Regulation, except in military equipment.

However, the equipment containing R-23, installed prior to 1st January 2016 can be discharged in case of fire.

Older systems may include perfluorocarbons (PFCs) such as perfluorobutane (PFC-31-10) and perfluoromethane (PFC-14), though the use of PFCs in new systems (including portable extinguishers) is banned since 2007. However, equipment containing PFCs installed prior to 4th July 2007 can be discharged in case of fire.

2.1.3 Sources of F-gas Emissions

Any fire protection system or extinguisher must be available for discharge at the moment a fire event occurs, and are therefore designed, manufactured and maintained in a manner that minimises loss of F-gases through leakage and inadvertent or unwanted discharge. Potential sources of F-gas emissions are:

- **Gradual leakage from the valve**
- **Unwanted/accidental discharge.** This is extremely rare as procedures are in place to prevent discharge through inadvertent fire alarms.
- **Emission during system maintenance.** F-gases are neither added nor removed during on-site maintenance – cylinders of gas are replaced during maintenance and all recovery and refilling operations are carried out in a specialist factory.

³ EN15004 is the European equivalent of ISO 14520.

- **Emissions at end of system life.** F-gases must be properly recovered during decommissioning, using recovery equipment and appropriately trained personnel.
- **Discharge onto a fire.** Although a rare occurrence, discharge onto a fire is crucial for saving life and property and is accepted by the Regulation as a legitimate use of F-gases.

New! The F-gas Regulation explicitly **prohibits** the intentional release of F-gases to atmosphere and requires that maintenance personnel take precautionary measures to prevent leakage of F-gases.

2.2 ODS

The main ODS used in fire protection systems are halons. However, under the ODS Regulation, the use of halons in fire protection systems is banned with the exception of critical uses, principally in the military and aviation applications.

End dates for critical use halon are set out in [Commission Regulation 744/2010](#) and apply to a range of applications such as military vehicles, aircraft and commercial cargo ships. The use of halon by airfields and airports in existing equipment has an end date of **31st December 2016**. After this date an alternative fire extinguishing medium must be used.

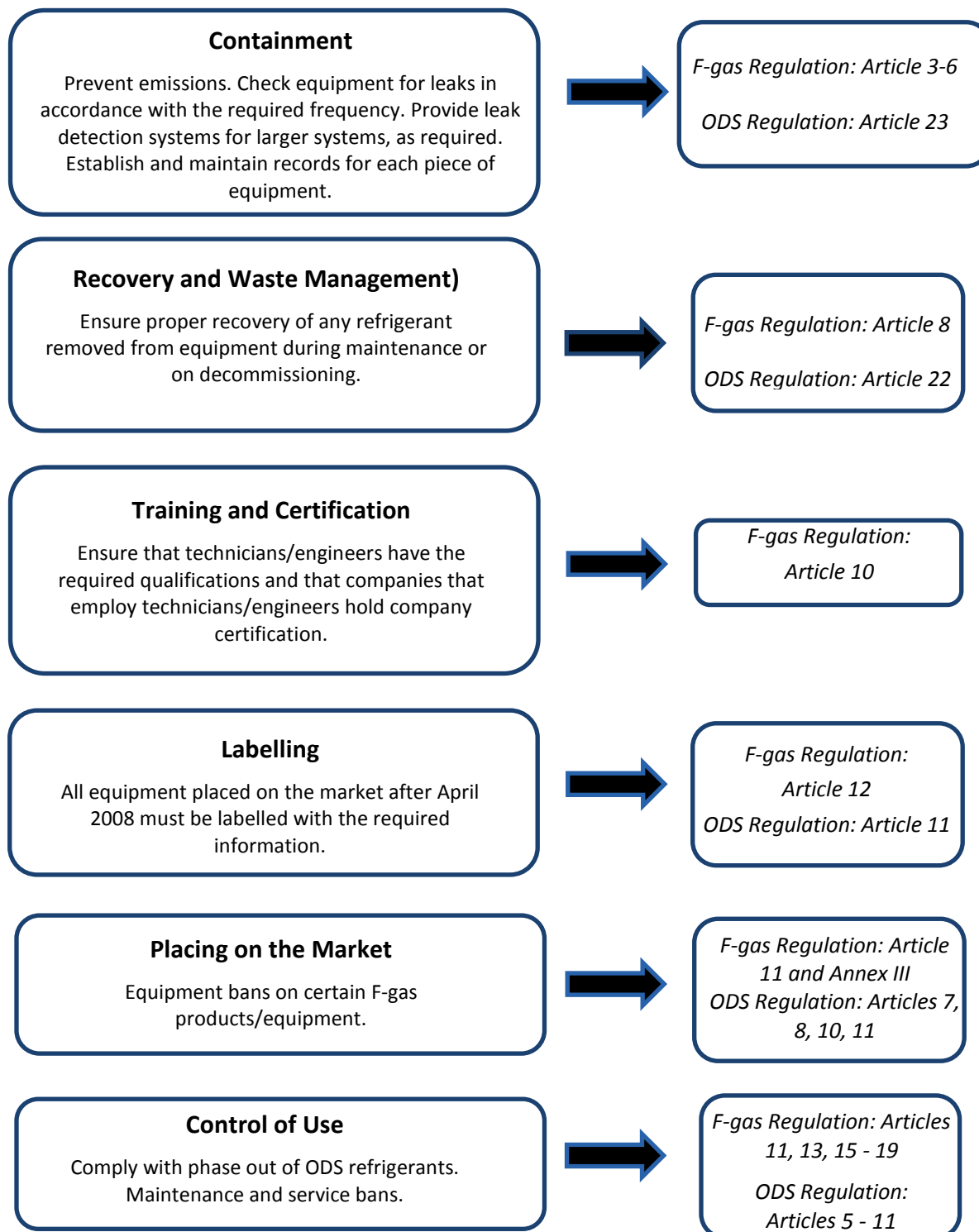
All obligations set out in the ODS Regulations regarding leak checking, labelling and record keeping apply to critical halon users.



Figure 1: Halon Fire Extinguisher

3. Summary of Obligations under the F-gas Regulation

Under the F-gas Regulation, operators⁴ of the fire protection equipment containing F-gases have certain obligations as summarised⁵ below.



⁴ The operator is defined in the F-gas Regulation as “the natural or legal person exercising actual power over the technical functioning of products and equipment covered by this Regulation”; in most cases this will be the owner of the equipment.

⁵ Daughter Regulations should also be referred to in addition to the relevant sections of the ODS and F-Gas Regulations outlined above. A list of the Daughter Regulations is provided in Appendix 1 of the Guidance Note titled “[Guidance Note for Contractors working with the equipment containing ODS and F-gases](#)”.

Operators are responsible for ensuring that they comply with specific obligations under the F-gas and ODS Regulations. Although qualified contractors carry out maintenance and servicing activities on behalf of the operator, it is the operator who must ensure that they are in compliance with the Regulations and who must present documentation to prove compliance on inspection.

4. Activities Requiring Certification

The activities relating to stationary fire protection systems and fire extinguishers listed in Table 2 below can only be carried out by personnel⁶ and/or companies holding an appropriate certificate.

Exemption: Certification is not required if these activities are undertaken during manufacture or repair at the sites of manufacturers.

Table 2: Activities Relating to Fire Protection Equipment Requiring Certification

Activity	Certified Personnel	Certified Companies
Installation of stationary fire protection systems	✓	✓
Maintenance or servicing of stationary fire protection systems	✓	✓
New! Repair of stationary fire protection systems	✓	✓
Leak checking of stationary fire protection systems containing F-gases in (New!) quantities of more than 5 t CO ₂ -eq	✓	✓
New! Decommissioning of stationary fire protection systems	✓	✓
Recovery of F-gases from stationary fire protection systems and fire extinguishers	✓	✓

Note:

- The operator is responsible for ensuring that personnel carrying out activities listed in Table 2 are certified.
- Certified personnel and fire protection companies (i.e. contractors) are responsible for the proper execution of the activities.

4.1 Certification

4.1.1 Companies

Operators must take reasonable steps to determine whether the company performing relevant tasks holds the necessary certificate. F-Gas Registration Limited is the certification company established in Ireland to issue company certificates⁷.

⁶ Personnel include in house personnel or external contractors.

⁷ Contractor company certificates can also be issued by a certification body in another Member State of the European Union and are mutually recognised in Ireland.

To obtain company certification, companies must:

- Employ a sufficient number of appropriately-certified personnel to cover the anticipated volume of relevant activities; and
- Prove that the necessary tools and procedures have been made available to the personnel engaged in those activities.

4.1.2 Personnel

The FETAC Special Purpose Certificate in Handling F-gas Fire Extinguishants (Award Code 5S0110) or equivalent⁸ is the qualification necessary for personnel working on fire protection systems containing F-gases. This was developed by the Further Education and Training Awards Council (FETAC⁹) to meet the minimum requirements set down in Commission Regulation (EC) [No. 304/2008](#).

New! All certified contractor personnel must have access to information regarding:

- Alternative fire extinguishants to F-gases and their safe handling; and
- Existing regulatory requirements for working with fire protection equipment containing these alternatives.

Note:

By 1st January 2017 all certification and training programmes for fire protection equipment are to be updated to reflect the changes and additional requirements of the F-gas Regulation, such as information on alternative technologies.

4.1.3 Existing Certifications

New! Certifications issued before 1st January 2015 (i.e. issued in accordance with the repealed F-gas Regulation) remain valid under the original conditions of issue. More information on training requirements can be obtained by contacting the [Fire Engineering Systems Association](#) (FESA).

4.1.4 Exemptions

Trainees are exempt for up to 1 year, but they must be enrolled on a relevant training course and must work under the supervision of a certified person.

⁸ Certificates for personnel (e.g. the UK qualification (Fire Industry Association (UK) F-Gas Certification for Fire Technicians) and for companies issued in one EU Member State are valid in all Member States.

⁹ The functions of FETAC have since been taken over by Quality and Qualifications Ireland (QQI), and further details on relevant certifications are available at www.qqi.ie.

5. Leak Checking

All newly installed equipment containing F-gases must be checked for leakage immediately after installation. Following that, the frequency of leak checking is dependent on the quantities of gas contained in the equipment and whether or not a leakage detection system is installed (see Table 3 below). In practice, most fire protection systems are leak checked twice per year in accordance with ISO 14520.

New! To encourage the use of lower global warming potential¹⁰ (GWP) alternatives, the F-gas Regulation replaces F-gas thresholds expressed as weight (charge in kg) with thresholds expressed in tonnes of CO₂ equivalent (t CO₂ eq) quantities; therefore the charge limit (in kg) for which leak checking applies will depend on the GWP of the F-gas.

This brings some F-gas containing equipment, which would previously have been exempt, into the leak checking regime, and also means that some equipment previously liable to regular leak checks may fall below the minimum threshold (see Table 4 and boxed example below).

For more information on leak checking frequencies and on how to calculate the quantity of gas contained in fire protection equipment see [“Summary Guide to the new Leak Checking Requirements”](#).

Table 3: New! F-gas Leak Checking Frequencies

Quantity of gas (t CO ₂ eq)	F- gas Leak Checking Frequency	
	No equipment fitted	Leak detection equipment fitted
≤ 5	None	None
5 - 50	12 monthly	24 monthly
50 - 500	6 monthly	12 monthly
≥ 500	3 monthly	6 monthly

Where an existing inspection regime is in place which meets ISO 14520 or EN 15004 standards the leak checking obligations of the Regulation can be considered to be fulfilled as long as the inspections are at least as frequent as set out in Table 3 above.

Table 4 lists common F-gases used in stationary fire protection equipment, their GWPs and the charge equivalent that equates to the different leak checking frequencies.

¹⁰ Global warming potential is the climatic warming potential of a greenhouse gas relative to that of carbon dioxide.

Table 4: GWP and 5, 50 and 500 t CO₂ eq charge equivalents (kg) of common F-gases used in fire protection equipment

F-gas	GWP	5 t CO ₂ eq (in kg)	50 t CO ₂ eq (in kg)	500 t CO ₂ eq (in kg)
HFC-23 ¹¹	14,800	0.34	3.37	33.78
HFC-125	3,500	1.42	14.28	142.86
HFC-227ea	3,220	1.55	15.53	155.28

Example – HFC-227ea

HFC-227ea is one of the most widely used HFCs in total flooding fire protection systems. The change from leak checking thresholds based on charge in kg to thresholds based on t CO₂ eq means that:

- Equipment containing just 1.55 kg (rather than 3 kg) of HFC-227ea will now be required to be leak checked (1.55 kg of HFC-227ea is equivalent to 5 t CO₂ eq); and
- Equipment containing 155 kg of HFC-227ea (rather than 300 kg) will now require automatic leakage detection to be installed (155 kg of HFC-227ea is equivalent to 500 t CO₂ eq).

For more information on leak checking please refer to "[Summary Guide to the new Leak Checking Requirements](#)".

5.1 Leak Checking Procedure

[Commission Regulation \(EC\) No. 1497/2007](#) on leakage checking requirements for stationary fire protection systems containing F-gases sets out the standard procedure to be followed by appropriately certified personnel when leak checking.

This procedure is detailed in Figure 2 overleaf.

¹¹ The use of HFC-23 is banned in fire protection equipment placed on the market from 1st January 2016.

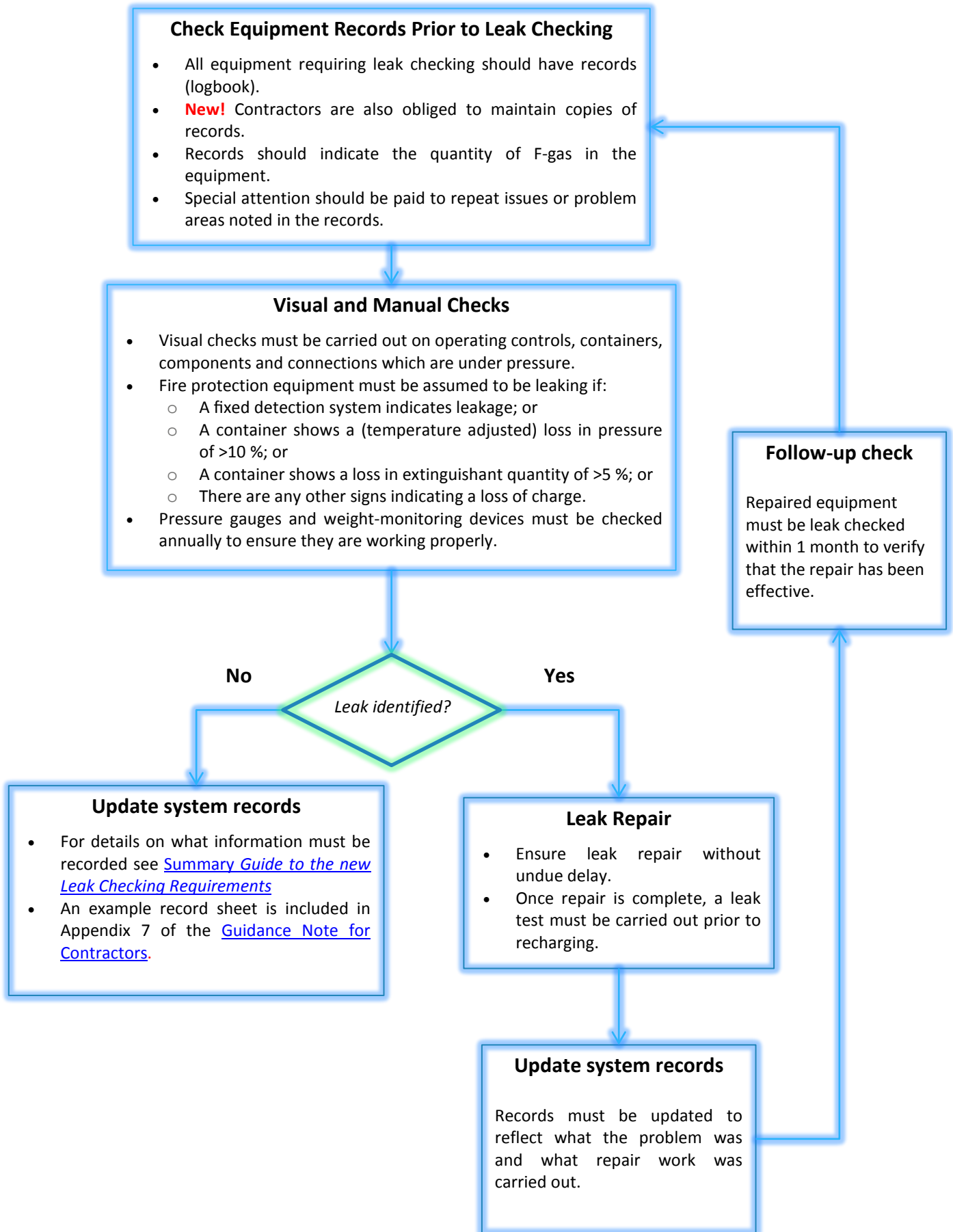


Figure 2: Stationary Fire Protection Systems Leak Checking Procedure