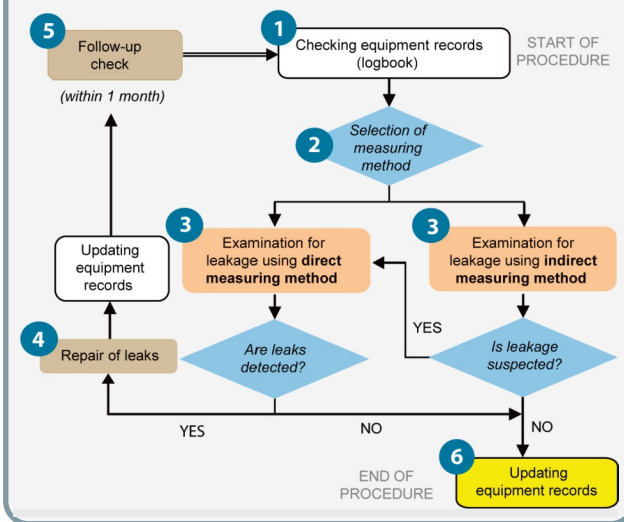


Standard checking for leaks according to Commission Regulation (EC) No 1516/2007



1. Checking equipment records (logbook)

Before carrying out leak checks, certified personnel must check the equipment records. These should indicate the F-gas charge, preferably also in CO₂ equivalents. Pay attention to any recurring issues and problem areas!

2. Selection of measuring method

Indirect measuring methods should only be applied if the parameters analysed can be expected to give reliable information on the charge and the likelihood of leaks.

Direct measuring methods are necessary to identify the exact location of the leaks and they may always be applied. Particular characteristics of the installation, e.g. ventilation of the environment, should be considered when selecting the most appropriate method.

3. Checking for leaks using an indirect or direct method

The following equipment parts need to be systematically checked: joints, valves (including stems), seals (including seals on replaceable driers and filters), any parts of the system subject to vibration and connections to safety or operational devices.

Indirect measuring methods

- Visual and manual checks of equipment parts, safety and operational devices
- Analysis of the following parameters: **pressure, temperature, compressor current, liquid levels, recharge volumes**

If leakage is presumed, a direct measuring method must be applied for further examination and to identify the exact location (see Regulation (EC) No 1516/2007, Art. 7(3)).

When the above-mentioned parts of the equipment show no sign of leakage but a leak is suspected, other parts of the system must also be checked.

Direct measuring methods

- Checks using gas detection devices, or
- Checks using proprietary bubble solutions/soapsuds, or
- Checks through the application of UV detection fluid (or suitable dye) in the circuit (only if approved by the manufacturer; to be undertaken by holders of category I certificates).

Before pressure testing with a suitable pressure testing gas (e.g. Oxygen-Free-Nitrogen), the refrigerant must be recovered from the whole system by personnel holding the appropriate certificate.

4. Repairing leaks

Detected leaks must be repaired as soon as possible. Where necessary, the repair must be preceded by a pump-down or recovery and followed by a leakage test (see above). The cause of the leak must be identified to avoid recurrence.

5. Follow-up check

After leaks are repaired, a follow-up leak check has to be carried out within one month and follow the above requirements. Please consider especially areas where leaks were found and any areas where stress was applied during the repair.

6. Updating equipment records

Equipment records must be updated after each leak check.

More information: http://ec.europa.eu/clima/policies/f-gas/legislation/documentation_en.htm

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Information for technical personnel and companies working with equipment containing fluorinated greenhouse gases

Refrigeration, air conditioning and heat pump equipment

Regulation (EC) 517/2014 on certain fluorinated greenhouse gases and implementing acts



Stationary refrigeration, air conditioning (AC) and heat pump equipment containing fluorinated greenhouse gases



Introduction

Fluorinated gases (F-gases) are potent greenhouse gases and include hydrofluorocarbons (HFCs), which are commonly used as refrigerants. Regulation (EU) No 517/2014 (the "EU F-gas Regulation") came into force in 2015 and aims to strongly reduce emissions as a substantial contribution to the EU's efforts of reducing climate change.

Who does this leaflet address?

This leaflet is intended for **technical personnel and companies** working with **F-gases in refrigeration, AC and heat pumps**. It provides information and guidance on the most relevant obligations, but is not of any binding or legal nature.

To account for the climate impact of F-gases, obligations are based on CO₂ equivalents. A conversion tool from metric units is available (see below under "More information").

Which are the relevant activities?

The following activities concerning stationary refrigeration, AC and heat pump equipment as well as refrigerated trucks and trailers can only be carried out by personnel and companies holding the appropriate certificate.

Activity	Certified personnel	Certified company
Installation	✓	✓
Maintenance or servicing	✓	✓
Leak checks of applications containing ≥5 t CO ₂ -eq of F-gases (≥10 t CO ₂ -eq if hermetically sealed and labelled as such)	✓	
Recovery of F-gases	✓	

Recovery of F-gases from AC in passenger cars and light trucks requires a training attestation. Recovery of F-gases from ACs of other road vehicles and refrigerated vehicles besides trucks and trailers requires appropriately qualified personnel.

Installation means joining two or more pieces of equipment or circuits containing or designed to contain F-gases irrespective of the need to charge the system after assembly. This includes joining gas carrying conductors to complete a circuit, with the intention to assemble a system at the place of operation.

Maintenance or servicing comprises all activities that entail breaking into the F-gas circuits, excluding the recovery and checks for leaks. This includes in particular:

- supplying the system with F-gases,
- removing one or more pieces of circuit or equipment,
- reassembling two or more pieces of circuit or equipment,
- repairing leaks.

Leak checking means the examination of the equipment for leaks of F-gases.

Recovery means the collection and storage of F-gases from equipment during maintenance, servicing and prior to disposal.

Important: The operator is responsible for making arrangements so that the above described activities are carried out by certified personnel. The certified personnel (and company) are responsible for the proper execution of the activities.

How to obtain a certificate

Personnel

There are 4 different categories of personnel certificates:

Certificate	<5 t CO ₂ -eq (hermetic <10 t CO ₂ -eq)			≥5 t CO ₂ -eq (hermetic ≥10 t CO ₂ -eq)				
	Activities permitted							
	R	I	M	L1	L2	R	I	M
Category I	✓	✓	✓	✓	✓	✓	✓	✓
Category II	✓	✓	✓		✓			
Category III	✓							
Category IV					✓			

L1 = Leakage check including breaking into refrigeration circuit

L2 = Leakage check without breaking into refrigeration circuit

R = Recovery, I = Installation, M = Maintenance or servicing

To obtain a certificate, personnel must pass a theoretical and practical examination organised by a designated evaluation body.

Companies

To obtain a certificate for installation, maintenance or servicing activities, companies must fulfil certain minimum requirements:

- Employ certified personnel for the relevant activities in a sufficient number to cover the expected volume of activities, and
- prove that the necessary tools and procedures are made available to the personnel.

Certificates issued in one Member State are valid in all Member States.

How to check for leaks

Stationary refrigeration, AC and heat pump equipment containing 5 t CO₂-eq of F-gases or more (10 t CO₂-eq or more if hermetically sealed) must be regularly checked for refrigerant leakage by certified personnel.

F-gas charge	Stationary refrigeration and AC			Refrigerated trucks and trailers
	≥5 t CO ₂ -eq (hermetic ≥10 t CO ₂ -eq)	≥50 t CO ₂ -eq	≥500 t CO ₂ -eq (hermetic ≥10 t CO ₂ -eq)	≥5 t CO ₂ -eq (hermetic ≥10 t CO ₂ -eq)
Without a properly functioning, appropriate leakage detection system in place	12 months	6 months	<i>leak detection system mandatory</i>	12 months
With a properly functioning, appropriate leakage detection system in place*	24 months	12 months	6 months	24 months

* Leak detection systems must be checked every 12 months to ensure proper functioning.

Other mobile equipment such as refrigerated vehicles (besides trucks and trailers) or ships as well as all mobile AC are not required to be checked for leaks.