



Steps 1 to 3 must be carried out always. If no leaks are suspected (indirect measuring methods) or detected (direct measuring methods), the procedure is completed by updating the equipment records (logbook) (step 6).

If leaks are detected, they have to be repaired as soon as possible and a complete check has to be carried out again within one month from the date of the repair.

### 1 Checking equipment records (logbook)

Before carrying out leak checks, certified personnel must check the equipment records. The records should indicate the F-Gas charge.

Special attention must be paid to relevant information on any recurring issues and problem areas!

### 2 Selection of measuring method

Certified personnel have to decide on the most appropriate measuring method (indirect or direct).

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

**Direct measuring methods** are necessary to identify the exact location of the leaks and they may always be applied. Nevertheless particular characteristics of the installation, e.g. ventilation of the environment, should be taken into account when selecting the most appropriate direct method.

### 3 Checking for leaks using an indirect or a direct method

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

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#### Indirect measuring methods

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

Situations which could constitute a presumption of leakage are listed in Regulation (EC) No 1516/2007, Art. 7(3).

Any presumption of leakage must be followed by the application of a direct measuring method for further examination and identification of the location of the leak.

#### Direct measuring methods

- Checks using gas detection devices (adapted to the refrigerant with a sensitivity of at least 5 g/year\*), 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 of the equipment). This activity entails breaking into the refrigeration circuit therefore it can only be undertaken by personnel holding a certificate of category I.

\*Portable gas detection devices should be checked every 12 months.

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.

Before pressure testing with a suitable pressure testing gas (e.g. Oxygen-Free-Nitrogen (OFN)) 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 with Oxygen Free Nitrogen (OFN) or another suitable pressure testing and drying gas, evacuation, recharge and leak-test.

After the repair, the equipment records must be updated with the relevant information. The cause of the leak must be identified as far as possible to avoid recurrence.

### 5 Follow-up check

After leaks are repaired, a follow-up check has to be carried out within one month. Special consideration should be given to areas where leaks had been found and repaired and in adjacent areas where stress was applied during the repair. The follow-up check must follow the requirements of a standard leak check.

### 6 Updating equipment records

Equipment records must be updated after each leak check.

**More information:** <http://ec.europa.eu/environment/climat/fluor>

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## Information

for

## Technical personnel and companies working with equipment containing fluorinated greenhouse gases

Stationary refrigeration, air conditioning and heat pump equipment



Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases and implementing acts

# Stationary refrigeration, air conditioning and heat pump equipment containing fluorinated greenhouse gases



## Introduction

Under the Kyoto Protocol, the European Union has made a commitment to reduce its greenhouse gas emissions by 8% compared to the base year 1990 between 2008 and 2012. Greenhouse gases covered by the Kyoto Protocol are amongst others, three groups of fluorinated greenhouse gases (F-Gases): hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>). Most of these F-Gases have a high global warming potential (GWP).

They are used in several applications, inter alia as refrigerants in stationary refrigeration, air conditioning and heat pump equipment.

Regulation (EC) No 842/2006 of the European Parliament and of the Council on certain fluorinated greenhouse gases (F-Gas Regulation) came into force in 2006. The aim of the Regulation is to reduce emissions of these gases and contribute to the Kyoto emission reduction target of the European Union and its Member States.

The Regulation, supplemented by 10 Commission Regulations (implementing acts), lays down specific requirements for the various stages of the whole life cycle – from the production to the end of life – of F-Gases. Consequently, various actors are affected by the Regulation.

## Who does this leaflet address?

This leaflet is for technical **personnel and companies** working with **stationary refrigeration, air conditioning and heat pump equipment** covered by the F-Gas Regulation. The aim of this document is to provide information and guidance on the relevant provisions of Regulation (EC) No 842/2006 and its implementing acts and is not of a binding nature. Information for operators of the above mentioned equipment is available in a separate publication.

## Which are the relevant activities?

The following activities concerning stationary refrigeration, air conditioning and heat pump equipment, unless undertaken at the sites of manufacturers during manufacture or repair, can only be carried out by personnel and companies holding the appropriate certificate according to Commission Regulation (EC) No 303/2008.

Activity	Certified personnel (*)	Certified companies
Installation	✓	✓
Maintenance or servicing	✓	✓
Leakage checking of applications containing ≥3kg of F-Gases (≥6kg if hermetically sealed and labelled as such)	✓	
Recovery of F-Gases	✓	

(\*) Under exceptional conditions (defined in article 4(3) of Commission Regulation (EC) No 303/2008) certain personnel are exempted from the certification requirements.

**Installation** means joining two or more pieces of equipment or circuits containing or designed to contain fluorinated greenhouse gas refrigerant, with a view to assembling a system in the location where it will be operated, including the action by which refrigerant conductors of a system are joined together to complete a refrigerant circuit irrespective of the need to charge the system after assembly

**Maintenance or servicing** comprises all activities that entail breaking into the circuits containing or designed to contain fluorinated greenhouse gases, excluding the recovery and checks for leakage. This includes in particular:

- supplying the system with fluorinated greenhouse gases
- removing one or more pieces of circuit or equipment
- reassembling two or more pieces of circuit or equipment
- repairing leakages

**Leakage checking** means the examination of the equipment for leakage of fluorinated greenhouse gas refrigerant

**Recovery** means the collection and storage of fluorinated greenhouse gas refrigerants from refrigeration, air conditioning and heat pump equipment

Important: While 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

Commission Regulation (EC) No 303/2008 defines four possible categories of personnel certificates.

	<3kg (hermetic <6kg)			≥3kg (hermetic ≥6kg)				
	Activities permitted							
Certificate	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. Commission Regulation (EC) No 303/2008 sets minimum requirements as to the practical skills and theoretical knowledge to be covered in the examination for each certification category. Certificates are issued by certification bodies designated by Member States.

## Companies

To obtain a certificate for installation, maintenance or servicing activities, companies must fulfil certain requirements. As minimum conditions, Commission Regulation (EC) No 303/2008 requires that companies:

- 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 have been made available to the personnel engaged in those activities.

Certificates are issued by certification bodies designated by Member States.

## Mutual recognition

Certificates issued in one Member State are valid in all Member States, but Member States may require a translation of the certificate.

## Interim certificates

In some Member States, interim certification systems will be in place for an interim period not exceeding 4 July 2011. Personnel and companies should contact the competent authorities in their Member State for more information. EU-wide recognition does not apply to interim certificates.

## How to check for leaks

Stationary refrigeration, air conditioning and heat pump equipment containing 3kg of F-Gas refrigerant or more (6kg or more if hermetically sealed and labelled as such) must be regularly checked for leakage of refrigerant by certified personnel.

F-Gas charge	≥3kg; (hermetic: ≥6kg) and <30kg	≥30kg and <300kg	≥300kg
Minimum frequency of leakage checks			
Without a properly functioning appropriate leakage detection system in place	every 12 months	every 6 months	every 3 months (*)
With a properly functioning appropriate leakage detection system in place	every 12 months	every 12 months	every 6 months

(\*) leakage detection system which on detection alerts the operator is mandatory for applications containing 300kg or more of F-Gases.